ADDIS ABABA UNIVERSITY, COLLEGE OF MEDICINE AND HEALTH SCIENCE SCHOOL OF PUBLIC HEALTH

ETHIOPIA FIELD EPIDEMIOLOGY AND LABORARORY TRAINING PROGRAM (EFELTP)

Compiled Body of Works in Field Epidemiology

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Submitted to the School of Graduate Studies of Addis Ababa University College of Health Science and School of Public Health in Partial Fulfillment of the Degree of Master of Public Health in Field Epidemiology

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School of Public Health

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Ethiopian Field Epidemiology Training Program [EFETP]

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EXECUTIVE SUMMARY

This document includes all the outputs achieved during the residency period of the field epidemiology training program. It has been compiled according to the format specified by the program and is submitted to the Graduate School of Public Health to fulfill part of the requirements for a Master's Degree in Field Epidemiology.The document is structured into nine chapters,incorporates the expected outputs generated throughtout the two-year in-service training system. **Chapter one** includes one thesis report. The study conducted on prevalence and determinants of uncontrolled hypertension using cross-sectional study design. **Chapter two** contains outbreak investigation on cholera outbreak done by case-control study. **Chapter three** focuses on the assessment of the health profile for Negelle district.Additionally, **chapter four** includes a design report on the analysis of four years aggregated hypertension surveillance data. **Chapter five** includes an hypertension system evaluation report of ,which conducted in Sheger city, Oromia. Similarly, **chapter six** contains narrative drought reports. Again **Chapter seven** contains two scientific manuscripts for research journals. One manuscript was prepared regarding the cholera outbreak, while another focused on the evaluation of the hypertension surveillance system. In **chapter eight**, two abstracts are presented: one on the cholera outbreak investigation and the other on the hypertension system evaluation. Lastly, the weekly public health emergency bulletin report of the Oromia Regional Health Bureau (ORHB) and other activities is included in **chapter nine**.

CHAPTER ONE: THESIS

1.1 Prevalence and Determinants of Uncontrolled Hypertension among the Hypertensive Adults on Treatment Follow up at Govermental Public Health Facilities in Sheger city, Oromia, Ethiopia, 2024. /across-sectional study/

Abstract

Background: Uncontrolled hypertension accounts for nearly 1 billion, accounts 66.8% in developed and 61.6% in developing countries, sub-Saharan Africa (SSA) is estimated 70% and Ethiopia ranges from 37-63%. Blood pressure control rates are critically low,with 30% of individuals achieving control at levels of 140/90mmHg.And the impact of social determinants on hypertension attributed mortality in the context of dveloping countries is not well understood, particularly in Ethiopia studies conducted on prevalence and determinants of uncontrolled HTN is limited and none research was conducted as Sheger city. Thus, the aim of the study was to determine the prevalence and determinants of uncontrolled hypertension at Sheger city.

Methods and materials: Cross-sectional study was conducted from March 1–April 30, 2024, at Sheger city. Simple random was used for selection of study health facilities and Systematic random sampling was used to select 354 participants.Uncontrolled hypertension is a reading ≥ 140/90 mmHg for those aged ≤ 60 years ,while BP ≥ 150/90 mmHg for those>60years. Demographic data, socioeconomic status and clinical characteristics were collected through face-to-face interviews and medical examinations. Data collected to and cleaned by kobo tool box and it was imported to SPSS version 26 for analysis. A descriptive statistics and binary and multivariate logistic regression model (AOR, 95% CI and p-value < 0.05) was used to determine the determinants of uncontrolled hypertension.

Result: From the total respondents, 185 (52%) were males. The mean age of the respondents was 55 years (SD ±12.9) years, which range from 25-98 years and more than half (62%) had age ≥ 50 years old. Prevalence of uncontrolled hypertension was found 89%. Alcohol consumption (AOR = 5.65, 95% CI: 1.05-23.63), saturated fat consumption 4-7 days/week (AOR = 16.52, 95% CI: 1.70–160.94) and Coffee consumption (AOR = 3.79, 95% CI: 1.11–12.97) were independent predictors of

uncontrolled hypertension. However, salt reduction (AOR = 0.20, 95% CI: 0.01–0.98), grains eating habit 4-7days/week (AOR = 0.08, 95% CI: 0.01–0.45), fruit eating habit (AOR = 0.03, 95% CI: 0.01–0.11) were independent protective factors for uncontrolled hypertension.

Conclusion: The prevalence of uncontrolled hypertension was found high. Alcohol, coffee, high saturated fat consumptions were the independent predictors of uncontrolled hypertension. So that health care professionals and other stakeholders should promote alcohol abstinence and Dietary Approaches to Stop Hypertension. Prompt identification and management of hypertensive patients are critical for effectively controlling hypertension.

Keywords: uncontrolled hypertension, prevalence, determinants, Shegercity Ethiopia.

1.1.1 Introduction

1.1.1.1 Background of the study

Hypertension is a condition characterized by abnormally high blood pressure, defined as the a systolic blood pressure (SBP) is equal to or above 140 mmHg and diastolic blood pressure (DBP) equal to or above 90 mmHg based on the average of equal or above two accurate blood pressure measurements taken at least in two visits (1,2). It is classified as uncontrolled hypertension if the SBP is ≥ 140mmHg and /or DBP is ≥ 90mmHg for the general population, or if SBP is ≥ 130mmHg and /or DBP is ≥ 80mmHg in individuals with established diabetes mellitus (DM) or chronic kidney disease (CKD)(3).

Uncontrolled hypertension poses a significant public health issue for hypertensive individuals both in high and low-income countries (LMIC)(4–6). Approximately 1 billion people worldwide are affected by uncontrolled hypertension(7) with rates of 66.8% in developed countries and 61.6% in developing countries(1). In sub-Saharan Africa (SSA) approximately 25% of adults are diagnosed with hypertension, with around 70% of these cases remaining uncontrolled(8). Despite Ethiopia's commitment to the sustainable development goal of reducing premature deaths from non-communicable diseases by one-third from 2016 to 2030, the annual mortality rate from these diseases, including uncontrolled hypertension, is still alarmingly high at 39%)(9). Research in Ethiopia reveals that the prevalence of uncontrolled hypertension varies between 37% and 63%. This condition greatly elevates the risk of cardiovascular, renal, and cerebrovascular diseases.(3,10–12). Uncontrolled hypertension is a major risk factor for cardiovascular, renal, and cerebrovascular morbidities and mortalities(13–15).

The most common negative outcomes linked to uncontrolled hypertension are cardiovascular-related, which can result in serious conditions such as stroke, ischemic heart disease, peripheral arterial disease, aortic aneurysm, and congestive heart failure(16,17). Similar to other chronic non-communicable diseases, the prevalence of uncontrolled hypertension in Ethiopia is increasing, primarily due to a rise in risk factorss(18). Studies have pinpointed several major contributors to uncontrolled hypertension, including age, gender, non-adherence to antihypertensive treatment, inadequate salt restriction, physical inactivity, and presence of comorbid disease (19–21).

Recognizing these determinant factors is essential for reducing uncontrolled hypertension in hypertensive patients. Thus this study seeks to assess the prevalence of uncontrolled hypertension and the related factors among patients undergoing treatment at public health facilities in Sheger city.

1.1.1.2 Statement of the Problem

Uncontrolled Hypertension continues an emerging public health problem globally, particularly in developing countries(4,6).And responsible for more than 9 million annual deaths or causes nearly as many deaths globally each year as infictious disease together(22). Even among those who have been diagnosed as having hypertension and are receiving anti-hypertension medication, BP control rates are seriously insufficient (30% controlled to 140/90 mmHg), despite the availability and advancement of diagnostic options and therapeutic interventions for hypertension with benefits in reducing cardiovascular morbidity and mortality(23,24) .Globally, it is anticipated that at least 1 billion persons have hypertension, with that number expected to rise to 1.5 billion by 2025, from which low- and the middle-income country accounts for more than two-thirds(6,7,25). According to the Systolic Blood Pressure Intervention Trial (SPRINT), aggressive versus standard BP control (systolic BP of < 120 vs<140 mmHg) reduces the risk of major cardiovascular events by 25% and all-cause death by 27% in individuals with hypertension(26). However, long-term complications like myocardial infarction, heart failure, stroke, and kidney disease become substantially more likely when hypertension is left untreated. The risk of severe cardiovascular and stroke events doubles for every 20 mmHg increases in systolic blood pressure to > 115 mmHg (or for every 10mmHg raise in DBP to >75mmHg(27). Uncontrolled HTN(UHTN) increases the chance of fatalities from all induces and CVDs(28,29).Less than 27% of HTN patients in industrialized nations and less than 10% of HTN patients in poor countries have been able to successfully manage their blood pressure.

An estimated 48% of HTN patients in Ethiopia had uncontrolled blood pressure(30).And no clear methods monitoring measures hypertension controlling Because of complex enviromental factors,including urbanization and lifesyle changes linked to economic growth,which have led to significant epidemiological shifts,such as HTN, in the African region.Additionally,HTN is initially asymptomatic,delaying early detection, diagnosis, and treatment. After initiation antihypertensive medications, patients may not notice immediate benefits and could experience

side effects, which is likely to negatively affect treatment outcomes. There are currently no studies that have investigated the factors contributing to uncontrolled hypertension in Sheger city. Limited efforts have been made to understand the prevalence and associated risk factors of HTN as well.This study aims to help fill the understanding gaps regaarding the prevalence and associated risk factors of uncontrolled HTN in the Sheger city (12).There are currently no studies that have investigated the factors contributing to uncontrolled hypertension in Sheger city. Limited efforts have been made to understand the prevalence and associated risk factors of HTN as well.This study aims to help fill the understanding gaps regaarding the prevalence and associated risk factors of uncontrolled HTN in the Sheger city.

1.1.1 3 Research Questions

- What was the prevalence of uncontrolled hypertension among the hypertensive patients on treatment follow up in Sheger city?
- What were factors associated with uncontrolled hypertension in Sheger city?

1.1.1.4 Significance of the Study

Hypertension is known as a silent killer for which most hypertensive patients do not recognize their symptoms; and understanding the variables that influence blood pressure control is crucial for improving the management and control of hypertension. Therefore, health facility-based assessing uncontrolled blood pressure and its determinants plays a pivotal role in follow up, and reduces further mortality and morbidity. Also there have been a several efforts, but causes of uncontrolled HTN in developing countries like Ethiopia have not been sufficiently investigated. Therefore, the aim of this study was to assess the magnitude and risk factors of uncontrolled high blood pressure in hypertensive patients who were visiting care in the Sheger city at health facilities based, Oromia, Ethiopia. The finding of the study will help the policymakers to contribute to designing the prevention and control strategy.

1.1.1.5 Scope of the Study

Although it was better to cover all health facilities in the present study, due to time and financial constraints, the researcher was limited and interested to study on those hypertensive patients on follow up and attending only at governmental health facilities.

1.1.2 Literature review

1.1.2.1 Hypertension

Hypertension(HTN) represents a significant global public health issue.It plays a critical role in the development and burden of various CVDs, including kidney failure, stroke, and heart disease, which are linked to premature death and disability(31). Due to inadequate healthcare systems, hypertension primarily impacts populations in low- and middle-income countries(31,32). In the early stages, hypertension is often asymptomatic and may go undetected, especially in communities with limited healthcare access and awareness(31). Even individuals who are aware of their blood pressure may lack adequate access to treatment and may struggle to manage their condition over time. Hypertension is categorized into two main types: primary (essential) hypertension and secondary hypertension. Over 90% of cases are classified as primary, which has no specific identifiable cause (idiopathic)(32). Possible contributing factors for primary hypertension may include genetic predisposition, environmental influences, dietary habits, or a combination of these elements. However, identifying the exact cause is challenging, as suggested by the term idiopathic. Secondary hypertension constitutes approximately 10-15% of cases and is associated with identifiable causes or risk factors. Comorbidities such as cardiac or renal diseases can result in persistently high blood pressure. Additionally, certain medications, including adrenaline, may elevate blood pressure if used for prolonged periods. Lifestyle factors, such as excessive salt intake, stress, regular alcohol consumption, and high-fat diets, contribute to the risk of secondary hypertension. When poor lifestyle choices are coupled with other unknown factors, they can lead to primary hypertension. Low- and middle-income countries, including Ethiopia, have made notable advancements in enhancing healthcare access and community awareness. However, these improvements have not been accompanied by corresponding changes in healthcare-seeking behaviors or patient adherence to antihypertensive treatments.(33).

1.1.2.2 Prevalence of uncontrolled hypertension

Worldwide, approximately 7.1 million fatalities per year directly related to hypertension, with prevalence up to 1 billion people and not meet their treatment goal(34). The proportion of hypertensive patients effectively treated with drugs has been remaining low,particularly in LMICs(35).The prevalence of uncontrolled hypertension according to study findings conducted

in various countries is as follows: Cross-sectional study design on 218 hypertensive patient at North Palestine by 2013 was (60%)(36), a hospital-based cross-sectional study on 1178 outpatients with diabetes by 2019 at Saudi Arabia was(71.8%)(37), cross-sectional study on 2643 hypertensive adults by 2015 was at Brazil was(55.7%)(38). Also a cross-sectional study was conducted in a primary care on 1092 participants by 2019 at Malaysia was (39.9%)(39), cross-sectional study conducted at three Afghan public hospitals on 950 hypertensive patients by 2022 was (77.3%)(40), to seen association on 3,092 individuals with T2DM and hypertensive patients were enrolled at Kerala, India by 2020 was (60%)(41),cross-sectional studies conducted on 440,383,354 and 265 hypertensive, and T2DM patients respondents by the year of 2012 were Cameron (63.2%)(42), Panama (66.7%)(43),Zimbabwe(67.20%)(44), South Africa (75.5%)(45) respectively, also a cross-sectional study was carried out on 525 type 2 diabetics in three Moroccan regions was (70.4%)(46). Generally, the majority of research done in Africa, Less than one-third of patients meet their treatment objectives(47). Additionally, a meta-analysis revealed that in most Sub-Saharan Africa(SSA), the control of Blood pressure(BP) to the target level (140/90mmHg) is less than 30%(8). Compared to numerous studies conducted in sub-Saharan Africa, where control rates hardly ever went over >45%(48). It has been demonstrated that European and American cohorts have superior control rates of hypertension, most likely as a result of greater awareness and availability to treatment in these settings. A difference in the standards used to categorize hypertensive individuals classified as controlled or uncontrolled blood pressure could potentially be the cause of this discrepancy. The majority of literature in the SSA, including Ethiopia, evaluated the rate of hypertension control using cutoff points from the JNC-7/8 guidelines(49). Compared to low- and middle-income nations, high income nations had nearly double the proportions of awareness(67.0% compared to 37.9%), as wellas treatment rates(55.6% compaed with 29.0%) and BP control (28.4% versus 7.7%) among patients with hypertension(50).

In Ethiopia, the prevalence of uncontrolled hypertension among patients receiving therapy were range from 11.4%-69.9 % which is, 11.4% at Gondar University Hospital(51), 48.6% at Tigray(34), 52.7% at Jimma University Teaching and Specialized Hospital(3),56.2% Bedele General Hospital(52), 58.8% Bishoftu town(30), and 69.9% at Zewditu Memorial Hospital(11).

6.1.2.3 Factors associated with uncontrolled blood pressure

Socio-demographic Variables

According to numerous research identified age is an independent predictor of uncontrolled hypertension(53). In high-, middle-, and low-income nation, a research conducted in rural and urban communities revealed that participants 50 years of age and older consistently had higher rates of treatment and controlled blood pressure than younger participants, in addition to greater awareness of their hypertension(35). A cross-sectional study done at Bedele General hospital and southwest Ethiopia revealed that the rate of uncontrolled blood pressure was higher among participants younger than 60 years of age and the factors significantly associated with uncontrolled blood pressure were age >60 years and the presence of comorbidity(52). This may be due to a denial of the disease's existence or young patients becoming overloaded with activities outside the home in young patients that makes them forget to take medications and physical inactivity in older age groups. Another study conducted in Addis Ababa, Ethiopia, found that patients under 60 years old were three times more likely to have uncontrolled blood pressure compared to those over 60 years (54). In opposite,an observational study from a resource-limited setting revealed that the rate of uncontrolled hypertension was higher among respodents aged over 60 years(20).

Clinical characteristics of Patients

Having a higher body mass index (BMI),one of the main risk factors for hypertension and numerous research on the subject have repeatedly shown a clear and direct dose-response association between BMI and blood pressure(6). In studies done at moroco (42.7%),(46), Cameroon(40%)(4) and Zimbabwe (62.7%) the magnitude of overweight was presented as high(44). Several studies have found that being overweight is a strong predictor of uncontrolled hypertension. Research conducted in Southern China(21) and Zimbabwe(44) revealed a statistical relationship between uncontrolled blood pressure and overweight.. Other studies conducted in Ethiopia, Jimma university hospital(3) and Ayder hospital(34) also revealed overweight and obesity were independent predictors of uncontrolled hypertension.

Co-morbidity like diabetic and kidney diseases had a significant association with uncontrolled hypertension in many literatures. Studies from South Asia(55) and South Africa(45) revealed a correlation between uncontrolled hypertension and co-morbidities of diabetes and kidney disease. Research from Ayder Hospital in Tigray, Ethiopia (50.3%)(19) showed that co-morbidities were highly prevalent and significantly correlated with uncontrolled blood pressure. An additional study conducted at Gondar University Hospital indicated that hypertensive patients

with comorbidities were more likely to experience uncontrolled hypertension(low blood pressure management was linked to the presence of diabetes mellitus, with AOR :3.6).(10)

Behavioral practice characteristics

According to rare research conducted at South Asia(55), Tanzania(48), Cameroon(42), and Zimbabuwe(44), using antihypertensive drugs was identified as protective against uncontrolled blood pressure. Medication non-adherence adjusted odd ratio(AOR) = 4.8, P < 0.001) was independent predictors of poor BP control across-sectional study done at University teaching hospital of Covada Beira(56). Medication adherence varief from 30.7% -81.3% as different studies conducted in Ethiopia, Which stated that poor adherence to antihypertensive medications was statistically associated with high blood pressure.Medication adherence varief from 30.7% -81.3% as different studies conducted in Ethiopia, Which stated that poor adherence to antihypertensive medications was statistically associated with high blood pressure(33)(19)(10))(45))(3).

Epidemiological studies have demonstrated that physical activity leads to significant reductions in blood pressure and weight, with recent prospective studies continuing to suggest a link between physical activity and the incidence of blood pressure (57). A sedentary lifestyle is a significant risk factor for high blood pressure. Therefore,non-adherence to physical exercise complicates the management of hypertension(58). As research conducted in at Ayder and Jimma university hospital prevalence of adherence to physical activity was 49.4%,52.7% respectively(19)(3). Again research done in sourthern China also found a significant association between a lack of physical activity and uncontrolled blood pressure(21).

Alcohol abstinence of non-adherence has been significantly associated risk factor to uncontrolled blood pressure(UBP) in many studies, like in South Africa(AOR:3.0 95% CI:1.1-7.8)(45) and Jimma,Ethiopia(AOR=2.48, 95% CI:1.07-5.71)(3).

Studies show that dietary adherence is one of the other significant elements that is relevant to blood pressure control. An implementing a dietary approach like the DASH diet or mediterranean diet, reducing saturated and total fat intake,raising potassium consumption, minimizing sodium in the diet, and limiting alcohol intake lowering and preventing blood pressure(59). A meta-analysis and systematic review were conducted to compare dietary groups rich in momounsaturated fatty acids(MUFA) and found that those with ≤ 12% were not as beneficial as those with >12%. The results showed that there were significant differences in

systolic and DBP showed a reduction of -2.26mmHg(95% CI:-4.28-0.25), while another measure indicated a decrease of -1.15mmHg (95% CI:-1.96-0.34) (60).

1.1.3 Conceptual framework

The preparation of this conceptual framework was based on the assumption that it would be useful for the "Assessment of Prevalence and Associated Factors of Uncontrolled Blood Pressure among Hypertensive Patients who are on treatment follow up or on medication" . To did the frame work first we defined the research problem of Despite being on treatment, many hypertensive patients experience uncontrolled blood pressure, raising key concepts or concerns about clinical, lifestyle, socio-demographic, behavioral factors and others factors (knowledge,stress). Next review literature by identifying gaps and relevant variables, and used arrows or lines to depict these relationships (figure 1). The framework attempted to identify potential relationships between the independent, dependent, and intervening variables and to highlight connected aspects that may have an impact on hypertension management.

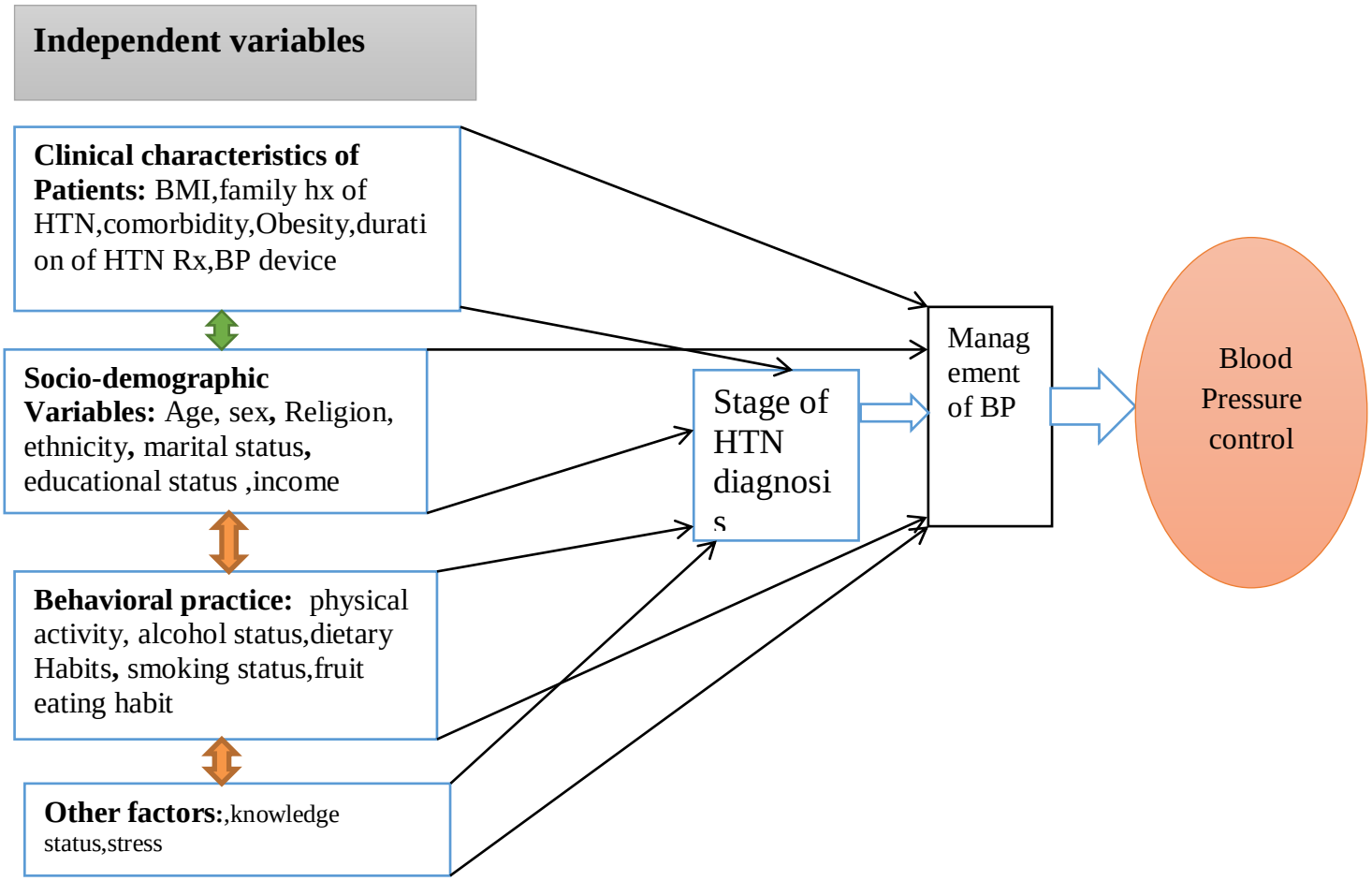

Figure 1:Conceptual framework of predictors associated with uncontrolled blood pressure.

1.1.4 Objectives of the study

1.1.4.1 General Objective

To assess the magnitude of uncontrolled hypertension and its determinants among hypertensive patients on treatment follow-up Sheger city, public Health Facilities, Addis Ababa, Ethiopia, 2024.

1.1.4.2 Specific Objectives

To determine the magnitude uncontrolled hypertension among hypertensive patients on treatment follow-up, in Sheger-city, Addis Ababa, Ethiopia, 2024.

To identify the determinants of uncontrolled hypertension among hypertensive patients on treatment follow-up, in Sheger-city, Oromia, Addis Ababa, Ethiopia, 2024

1.1.5 Methodology

1.1.5.1 Study Area

Research study was conducted at Sheger city, the mayor for the new city administration, is located approximately 25km north of Addis Ababa (AA). Sebata, Burayu, Gafarsaguje, Malkanono, Koyefache, Kuradida, Furi,Legatafolededi, Sululta, Manaabichu and Gelan towns, are the 12 sub-cities which surround Addis Ababa from all directions, are now clustered as a single city under a single mayoral administration and covers an area of 160,892.8 hectares. It lies between latitude 8.91971 north and longitude 38.76301 with an average annual rainfall 1165mm and. And the administration is operational already as the special zone was created after the census of 2007; it is hard to find correct data about its population. According to the 2007 census conducted by the Center of statically Agency (CSA), the estimated population size is 794,489, of this 28.75%, identified as urban residents. (61). However, estimated total population has been used is 2,873,093 from these 48% (1,379,629) males, 45% (1,306,242) females. There are twenty five (25) health centers and 1 primary hospital, many health posts and private health facilities in the district that provide primary healthcare services to the community. This study was conducted in 12 health facilities.

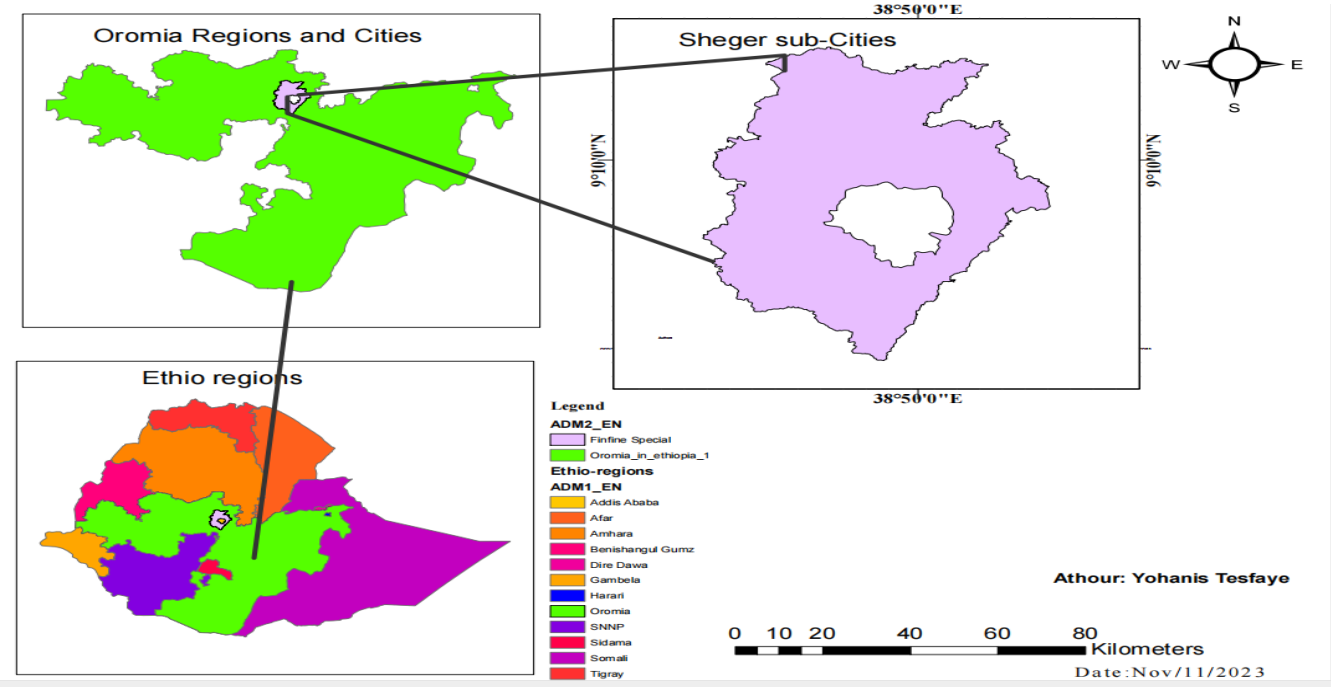

Figure 2:Map of Study Area (Sheger City)

1.1.5.2 Study Period

Research study was conducted From March/ 1/2024 to April/30 /2024.

1.1.5.3 Study Design

Facilities-based cross-sectional study design was carried out.

1.1.5.4 Source population

The source population were all adults diagnosed with hypertension who access public health care in Sheger city.

1.1.5.5 Study population

The study populations were hypertensive patients who were on treatment follow-up for at least 6 months at selected primary health care facilities patients' rosters and enrolled in the cross-sectional study in Sheger city during the study period.

1.1.5.6 Eligibility criteria

Inclusion criteria

All adult (≥ 18 years old) hypertensive patients(62) who had been currently taking on anti-hypertensive medication and treatment, follow up for at least 6 months came to the outpatient department of medicine for follow-up visits during the study period and residing within the Sheger city.

Exclusion criteria

However, unconscious patient, and pregnancy mother, critical ill hypertensive patients, who were seriously ill at the time of data collection and unable to respond to the questions, patients who declined to participate in the study, and those whose medical records lacked information on their demographics and blood pressure were all excluded.

1.1.5.7 Sample size determination

Sample size was calculated using single population proportion formula with the assumptions of the magnitude of uncontrolled hypertension (p = 0.7) taken from a previous study done in Zewditu Memorial hospital, Ethiopia(11), 95% confidence level (the critical value Zα/2 = 1.96), 5% margin of error, 10% contingency for non- response and 1.096 of design effect(DEFF). Then, the final sample size becomes 354.

$$n = (Z\alpha/2)^2 \, p\,(1\text{-}P)/d^2 * DEFF$$

Where**: n=**the required sample size**, Z α/2** = standardized normal distributions curve value for 95% confidence interval, **p** = the proportion of uncontrolled blood pressure, and **d** = the margin of error between the sample and population, **DEFF= (**Design effect for simple random sampling).

1.1.5.8 Sampling procedure and techniques

A total of 12 health facilities, 11 health centers, were selected using simple random sampling from the list of all available twenty health centers and one hospital, which was purposely selected because there is one hospital in Sheger city. The calculated sample size was then proportionally assigned to thrandomly selected health facilities based on their previous 3-month average client flow for hypertension follow-up during the study period. A sampling frame was

established using the medical registration numbers of the patients from the 12 randomly selected health facilities. Sampling frame was created using the patients' medical registration number and the study participants were drawn from each selected health facility using systematic random sampling. The sampling ssinterval at each health facility was calculated by dividing the average number of hypertensive patients in the previous 3 months at the 12 selected health facilities by the required sample size to determine the number of participants to be drawn from each facility.

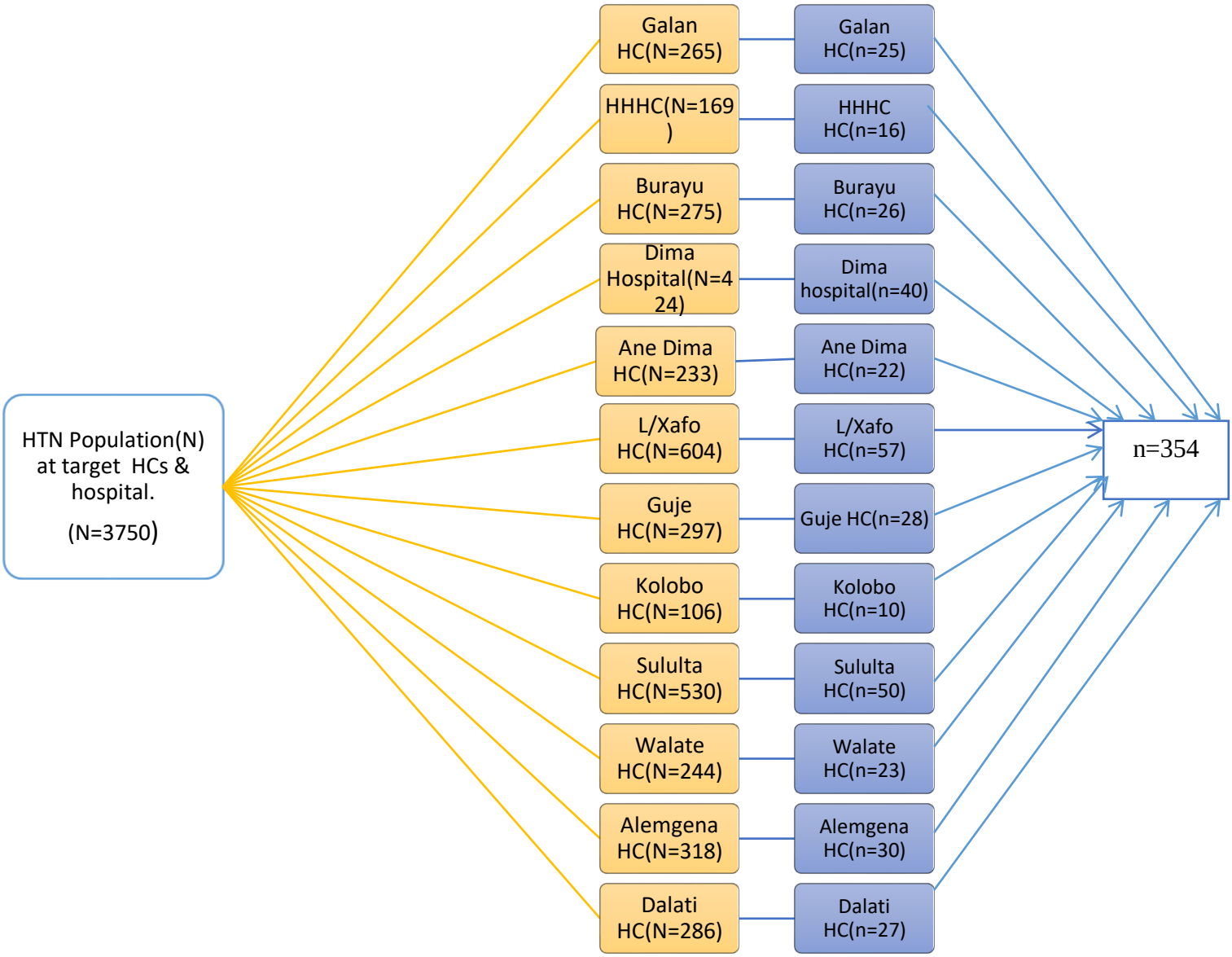

Figure 3:Schematic representation of the sampling technique study participants Sheger city.

1.1.5.9 Study Variables

1.1.5.9.1 Dependent variable

- Uncontrolled blood pressure.

1.1.5.9.2 Independent variables

Socio-demographic characteristic: (age, sex, marital status, religion, ethnicity, occupation, income, educational status, and residence).

Behavioral characteristics: (anti-hypertension medication adherence, salt intake, physical activity status, alcohol status, smoking status) and

Clinical characteristics (duration of hypertension, family history of hypertension, availability of BP cuff at home, BP monitoring at home or any else, co-morbidity, BMI status, number of anti-HTN drugs).

1.1.5.10 Operational Definition

Uncontrolled BP: BP reading ≥ 140/90 mmHg for those aged ≤ 60 years ,while BP ≥ 150/90 mmHg for those>60years(63)(64,65) despite being on antihyperensive treatment,BP is assessed using the average of two or more accurate measurements taken on the day of the interview, along with readings from the previous consecutive two visits by trained health professional.

BP measurements for hypertensive patients were reviewed from their last six-month follow-up visits. A trained data collector/proffession used a calibrated sphygmomanometer, ensuring proper cuff size and technique. Patients sat comfortably for at least five minutes, avoiding caffeine and cigarettes beforehand. With bare arms at heart level and legs uncrossed, two back-to-back measurements were taken after inflating the cuff until no sound was heard, then slowly deflating it. A minimum five-minute gap was maintained between measurements, and the mean BP was recorded.

Comorbidity :refers to the presence of one or more additional health conditions in patients diagnosed with hypertension like stroke,chronic kidney disease,diabetes mellitus,coronary artery disease by reviewed patient records which was diagnosed by physicians.

Adherent to drugs: Medication adherence was assessed with the 8-item Morisky Medication Adherence Scale (MMAS-8) (range from 0 to 8), this self-report scale consists of 7 items answered with a yes or no and 1 item with a 5-point Likert scale. A score below 6 indicates low adherence, a score between 6 < 8 medium adherences and a score of 8 high adherences(33).

Not-adherent to medication: hypertenive client/patient scoreMorisky Medication Adherence Scale(MMMAS) less than 6 (33).

Non-adherent to alcohol consumption: patient who said having never drink alcohol or intake limit amount 2 standard/day for men or 1 stardand for women and has who said minimum 2 alcohol free days/week as WHO standard guideline (63,65).

Body Mass Index(BMI): patient's weight in kilograms(Kg) divided by height in square meters was calculated by trained data collectors.BMI classified were according to the WHO, namely obese ≥ 30 kg/m2, under weight <18.5kg/m2, normal weight 18.5-24.9kg/m2)(65).

Obesity: Classified as a BMI of 30kg/m2 or higher(63).

Adherent to diet: hypetensive patients who having habit of consumed a diet rich in fruits,grains,vegetables limited or never ate food rich in saturated fat like meat ,dairy fat and oil.Interpreted as none(less than one day/week,moderate adgherence 1-3 days/week,high adherence 4-7 days/week) restricted,reduced in take of salt; as World Health Organization (WHO) standards, reduced Salt intake (an individual's or population's salt consumption is below 1 teaspoon(5 grams) per day. And not Reduced Salt intake if exceeds 1 teaspoon(5 grams) per day.

(63,65).

Physical activity-related adherence: Physical activity was assessed by asking how many minutes per day and days per week a patient spent doing physical activity. This physical activity includes jobs or sports that require moderately intense activity that only slightly increases breathing or heart rate, such as cycling, swimming, volleyball, dancing, farming, gardening, and housework. It also includes activities like brisk walking, carrying light loads, swimming, and dancing. If the participants engaged in physical activity for at least 30 min per day, at least five days a week (≥ 150 min per week), they were considered physically active(63,65).

Habitual coffee consumption: Information on habitual coffee intake was collected with 1 item: "How many days of the week do you drink coffee?" Participants were defined as "coffee

drinkers" if they drank coffee three or more times per week; otherwise, they were regarded as "non-drinkers(63,65).

Smoking-related adherence: respondents who reported having never smoked or stopped smoking(63,65).

Educational status: is categorized in to four mutually exclusive categories.

Can't read and write includes participants who are not able to read and write.Can read and write includes participants who never took or followed formal education; However, they might take informal education (e.g., religious education) thus they are able to read and write.Primary includes participants who followed primary level formal education. Secondary educational status includes participants who followed secondary level formal education. College and above includes participants who are honored of college diploma and above.

Knowledge about lifestyle management of hypertension

Good knowledge: knowledge score above the mean value on hypertension evaluation of lifestyle and management (HELM) scale(32).

Poor knowledge: knowledge score below the mean value on hypertension evaluation of lifestyle and management (HELM) scale(32).

1.1.5.11 Data Collection Procedure

1.1.5.11.1 Data collection tool

Data were collect using a face to face/interviewer based/ structured questionnaire, document review and physical measurements using the World Health Organization (WHO) stepwise approach. The questionnaires were adapted from validated scales and published articles and modified for the study's context. The questionnaire contained three parts (Part I contains socio-demographic characteristics, Part II contained questions related to clinical characteristics of patients and part III contained questions related to behavioral practices) (Annex II). The abstraction of data format was used to record the necessary information from patients' medication records (Annex III). Data were collected by trained health personnel. The investigator was monitored the data collectors to ensure the quality of data that were collected.

1.1.5.11.2 Assessment of adherence to diet-related practice and other behavioral practices

Diet-related adherences were assessed using food frequency questionnaire consisting of the commonly used food items and salt restriction status. In food frequency questionnaire for each

item, seven response categories were provided with a choice of frequencies: Never, once a week, two-three times per week, four-six times per week, once a day, two-three times per day and more than three times per day. For salt restriction questionnaire, four response categories were provided with possible choices of totally avoiding, decreasing in amount, the same amount or quantified amount. The adherence of other behavioral practices such as physical activity, cigarette smoking status and alcohol consumption status were assessed based on the national guideline recommendations.

1.1.5.11.3 Adherence to medication assessment

The eight-item modified Morisky medication adherence scale (MMMAS-8) was used to assess drug-related adherence. MMMAS-8 is a structured self-report measure of medication-taking behavior which had eight response categories.The scoring system was (for item 1 to 7,if respone is ‘’No’’ score=1,for item 5; if response is ‘’Yes’’;score=1,’’No’’ score=0,for item 8;if ‘’never’’:score=1,all the time=0,once in a while=0.75,sometimes=0.5,usually=0.25.The final score was sum of scores from all eight items.

1.1.5.11.4 Anthropometric measurements

Anthropometric measurements were conducted following the WHO stepwise approach.Participants’ height and weight were measured to calculate BMI for assessing overweight/obesity.Height measured in centimeters(cm) using a potable height board,with participants standing barefoot and feet together, while weight in kilograms(kg).

1.1.5.11.5 Blood pressure measurement

Blood pressure(BP) was assessed during the interview and from the last two visits. Measurements were taken twice while the participants was seated,using astandard sphygmomanometer cuff that covered two-thirds of the upper arm,Participants rested for at least 5 minutes before the first measurement,with the second measurement taken 5 to 10 minutes later.

1.1.5.11.6 Data collection procedure

Respondents were asked to gather socio-demographic information,clinical characteristics, diet and behavioral practices, and details about their medications. A medical record review was conducted to extract data on co-morbid conditions,previous blood pressure measurements,and types of antihypertensive medications.Six nurses from the hypertensive chronic follow-up unit were recruited as data collectors.They received a full day of training on interviewing techniques

and the proper use of the data abstraction format to gather information from patients and their medication records.

1.1.5.11.7 Data Quality Control

The questionnaire was prepared first in English and translated into Afaan Oromo, Amharic and retranslated back to English to check for consistency. Seven (7) data collectors and one supervisor was given training until they reached the same understanding on the questionnaire. To ensure the completeness, accuracy, and consistency of information during data collection, the principal investigator and supervisor was made a thorough check before receiving the filled questionnaire from each data collector and cross check proper data collection. To ensure the quality of data the following activities were done: adapting questionnaires from Standard tools, then translated in to Amharic. Training was given to data collectors on sampling procedures, methods of document review and data collection process and supervised by the principal investigator. Pre testing of questionnaire was undertaken to check the understandability by taking 5% of sample from other health centers which were not included in the actual data collection. Inconsistent and incomplete data were managed accordingly before data entry in computer software's.

1.1.5.11.8 Data sorting/processing and analysis

Data was entered and cleaned by kobo tool box and it was exported to Statistical program for social science (SPSS) version 27 for analysis. Then data were coded in non-overlapping code. Descriptive and analytical statistics like percentages were carried out. Chi-square test was conducted for categorical variables. Variables with p-value <0.25 were candidated variables and entered into the final logistic regression model odds ratio with corresponding to 95% Confidence Interval (CI) was used to quantify the association between a dependent variable and independent variables. Variables with p- value <0.05 were taken as statistically significant and considered factors associated with uncontrolled HTN cases. The final result was presented using text, tables, graphs, and percentages.

1.1.5.11.9 Ethical Consideration

Ethical clearance letter was obtained from Addis Ababa University (AAU) School of public health ethical review committee. Then the official supportive letter was given for all concerned bodies including Health Office of Sheger city by explaining the purpose of the study. Oral

consent was obtained before starting data collection process. Respondents' name did not written rather only code was given to each respondent to keep confidentiality.

1.1.5.11.10 Dissemination of result

The finding of the research done was submitted to the School of Graduate Studies of MPH program School of Public Health, Addis Ababa University. The copy of the finding was shared to Sheger city Health Office and others concerned bodies through report. Also attempt have been made to publish the paper in scientific journals.

1.1.6 RESULTS

Socio-demographic characteristics of the respondents

In the study, 354 hypertensive respondents had participated with 100% response rate. The mean age of the study participants was 55 years (SD ±12.9) years which range from 25-98 years and more than half (62%) had age ≥ 75 years old. From a total 354 respondents around half (52%) were males, and Oromo in ethnicity and (56%) of the respondents were orthodox Christian followers. Majorities of respondents 107(30%) of participants were house wives and 90(25%) others (driver and unemployed) in terms of their occupational status. From the total, 312 (88%) of the study participants were urban residents. The educational status showed that about 19% of participants had never attained formal education and 58(16%) was Colleague and above (Table 1). About half (47.3%) of the respondents had poor knowledge on hypertension.

Table 1:Socio-demographic characteristics of the respondents public health facilities, Sheger city 2024

Variable	Category	Frequency, n	Percentage (%)
Sex	Male	185	52
	Female	169	48
Age	≥ 55 years old	340	96
	<55 years old	14	4
	Median=60 years(IQR=15 years)		

Ethnicity	Oromo	183	52
	Ahmara	124	35
	Tigre	10	3
	Guraghe	26	7
	Others	11	3
Religion	Orthodox	198	56
	Muslim	77	22
	Protestant	59	17
	Catholic	13	4
	Other	7	2
Occupational status	Farmer	21	6
	Civil servant	67	19
	Merchant	68	19
	House wife	107	30
	Others*	91	26
Educational level	No formal education	68	19
	Primary education(1-8 grade)	156	45
	Secondary education(9-12 grade)	72	20
	College and above	58	16
Residence	Urban	312	88
	Rural	42	12
monthly income(ETB)	Median(IQR)	5000 birr(3,425)	
Others* in occupation means Driver and unemployed			

Behavioral / life style- related characteristics

In this study, 100(28%) of the participants were Alcohol drinkers of two to four standard drink, only 16 (4%) were current smokers, and 184 (246.2%) were habitual coffee drinkers. Among the study participants, 194(55%), 138(39%), 277(69.6%), 165(47%), 246(70%) and 268(76%) eat grains, vegetables, meat, saturated fat and fruits 1–3 days per week (Table 2).

Table 2:Behavioral (life style related) characteristics of the study participants at government public health facilities Sheger city, 2024

Variable	Category	n(%)
Physically activity	Yes	106(30)
	No	248(70)
Alcohol Consumption	Yes	100(28)
	No	254(72)
Smoking habit	Yes	16(5)
	No	338(95)
khat Chewing	Yes	0(0)
	No	354(100)
Salt reduction	Not reduced in amount	64(18)
	Reduced in amount	290(82)
Grains eating habit	1 to 3 days/ a week	144(40)
	1 to 3 days/ a week	210(59)
Vegetable eating habit	1 to 3 days/ a week	201(57)
	4 to 7 days/ a week	153(43)
Lean meat eating habit	1 to 3 days/ a week	165(47)
	4 to 7 days/ a week	43(12)

	Never	32(9)
	Once a monthly	114(32)
Saturated fat eating habit	1 to 3 days/ a week	246(70)
	4 to 7 days/ a week	68(19)
	Never	40(11)
Fruit-eating habit	1 to 3 days/ a week	339(96)
	4 to 7 days/a week	15(4)
Coffee consumption	Yes	277(78)
	No	77(22)
Sweet meals consumption (sugar, chocolate etc.)	1 to 3 days/ a week	183(52)
	4 to 7 days/ a week	66(19)
	Never	105(30)

Clinical / disease- related characteristics

In this study, 126(36%) participants had a family history of HTN, and majorities of them 179(79%) were diagnosed with HTN between 5 and 10 years. Of the participants, 141(40%) had a history of missed follow-up, and 287(81%) measured their BP monthly. About 118(33%) had a comorbid illness, and of those, 56(16%) had diabetes. Moreover, 138(40%) had BMI measurements in over weight range (

Table 3).

Prevalence of uncontrolled hypertension

This study revealed that the overall prevalence of uncontrolled hypertension was 316(89%) and prevalence of controlled hypertension 38(11%) (

Table 3).The three consecutive follow-up mean SBP and DBP of the patients were 151mmHg with SD of 12.2 mmHg and 97mmHg with SD of 19 mmHg respectively. The overall mean systolic blood pressure (SBP) was 150.0 ± 11.0 mmHg and 152.0 ± 12.2 mmHg among males and females respectively and that of mean diastolic blood pressure was 95.0 ± 14.0 and 97.0 ±

16.0 mmHg among males and females respectively. The mean SBP increased with age (Figure 4).

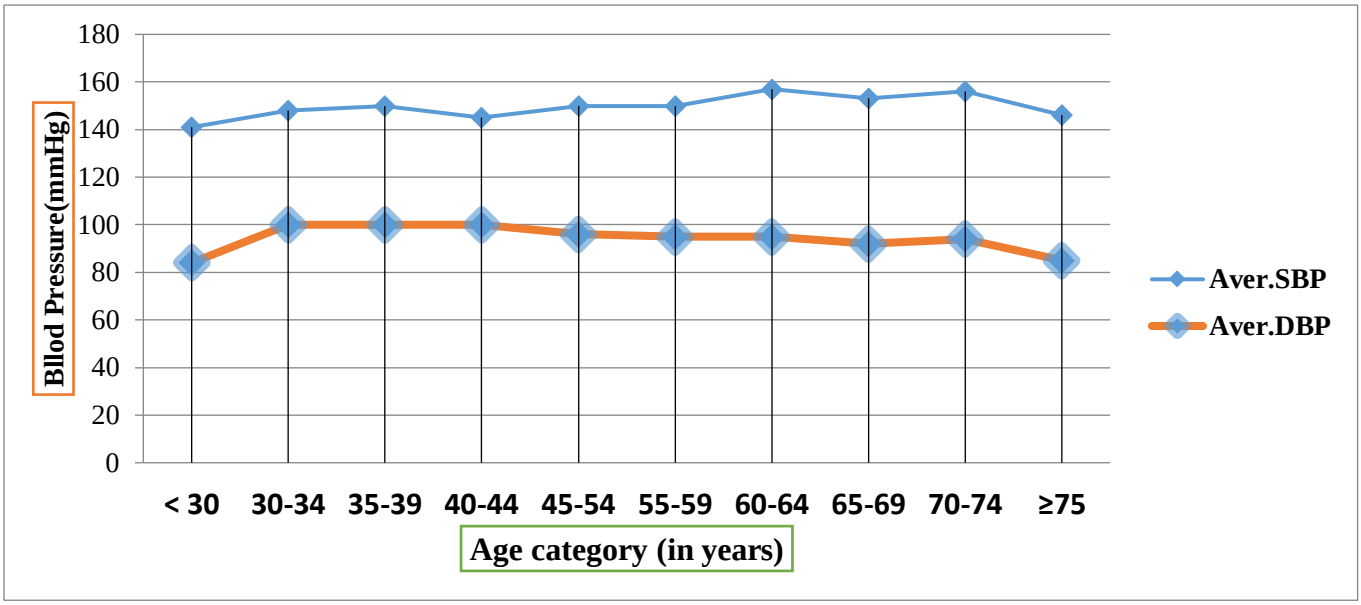

Figure 4:Mean Systolic and diastolic blood pressure by age

Table 3:Clinical/disease-related characteristics of the study participants at government public health facilities Sheger city, 2024.

Variable	Category	n(%)
Blood pressure status	Controlled	38(11)
	Uncontrolled	316(89)
Family history of hypertension	Yes	126(36)
	No	228(64)
Presence of comorbidity	Yes	118(33)
	No	236(67)
Type of comorbidity	Stroke	31(9)
	Chronic kidney disease	13(4)

	Diabetes mellitus	56(16)
	Coronary artery disease	7(2)
	Others*	12(3)
Medication adherence	Yes	273(77)
	No	81(23)
Availability of BP cuff at home	Yes	45(13)
	No	309(87)
Duration since initiation of anti-Hypertensive medication(in years)	< 5	304(86)
	5-10	44(12)
	>10	6(2)
Duration of hypertension(in years)	< 5	179(79)
	5-10	63(18)
	>10	12(3)
Stage of hypertension	Stage 1	222(63)
	Stage 2	89(25)
Follow up frequency	Every two weeks	10(3)
	Every month	287(81)
	Every two months	57(16)
Follow up miss	Yes	141(40)
	No	213(60)
BMI(Kg/m2)	Under Weight(<18.5)	11(3)

	Healthy Weight(18.5-24.9)	155(44)
	Over weight(25.0-29.9)	138(40)
	Obese(≥30.0)	50(14)
Systolic Blood Pressure(SBP),[Mean ±SD)	(151 ± 12 SD)	
Diastolic Blood Pressure,[mean ± SD]	(97 ± 19 SD)	

Factors associated with uncontrolled blood pressure

The association between different characteristics of the study participants and uncontrolled hypertension was determined after the model has been checked for multicollinearity and model fitness; variables with a p-value <0.25 in the bivariate analysis were chosen as candidate variables for the final model. Thus, ,a chi square and bivariate analysis revelead that there association between uncontrolled blood pressure and factors,namely: Physically activity, Consumption salt, consumption of grains, vegetable, fruit, sugar, meat, coffee, lack of knowledge uncontrolled HTN harm health, Saturated fat eating habit comorbidity, Frequency of Follow up. Following adjustment for potential confounding factors with multivariable binary logistic regression analysis a significant association was identified between uncontrolled blood pressure and alcohol adherence, salt intake, inadequate fruit and grains, habitual coffee and higher saturated fat consumption and the presence of comorbidity were independent predictors of uncontrolled BP at a p-value < 0.05. Participants with Saturated fat eating habit were 9.31 time more likely to have uncontrolled hypertension (

Table 4).

Table 4: Bivariate and multivariable logistic regression analysis result for significant variables among hypertensive on follow-up at government public health facilities in Sheger city, Oromia, Ethiopia, 2024 (n = 354)

Variable	Category	Blood pressure status		COR (95% CI)	AOR (95% CI)	P-Value
		Uncontrolled	Controlled			
Physically activity	No	229(92%)	19(8%)	Reference	Reference	0.50
	Yes	87(82%)	19(18%)	0.38(0.19-0.75)	0.69(0.23-2.06)	
Alcohol Consumption	No	219(86%)	35(14%)	Reference	Reference	0.041*
	Yes	97(97%)	3(3%)	5.17(1.55-17.21)	5.65(1.05-23.63)	
Salt reduction	Not reduced amount	63(98%)	1(2%)	Reference	Reference	0.00*
	Reduced amount(≤ 5g or 1 teaspoon)	253(87%)	37(13%)	0.11(0.02-0.81)	0.20(0.01-0.98)	
Grains eating habit	1-3 days/week	142(99%)	2(1%)	Reference	Reference	0.00*
	4-7 days/week	174(83%)	36(17%)	0.07(0.02-0.29)	0.08(0.01-0.45)	
Vegetable eating habit	1-3 days/week	188(94%)	13(7%)	Reference	Reference	0.16
	4-7 days/week	128(84%)	25(16%)	0.35(0.18-0.72)	0.42(0.12-1.39)	
Fruit	No	221(97%)	8(3%)	Reference	Reference	

	Yes	95(76%)	30(24%)	0.12(0.05-0.26)	0.03(0.01-0.11)	0.00*
Lean meat eating habit	1-3 days/week	149(90%)	16(10%)	Reference	Reference	0.23
	4-7 days/week	42(98%)	1(2%)	4.15(0.58-35.00)	5.92(0.33-106.23)	
	Never	26(81%)	6(19%)	0.47(0.17-1.30)	1.28(0.19-8.68)	0.80
	Once a monthly	99(87%)	15(13%)	0.71(0.3-1.50)	1.84(0.49-6.95)	0.37
Saturated fat eating habit	1-3 days/week	216(88%)	30(12%)	Reference	Reference	0.02*
	4-7 days/week	67(98%)	1(2%)	9.31(1.25-69.53)	16.52(1.70-160.94)	
	Never	33(82%)	7(18%)	0.66(0.27-1.61)	1.45(0.32-6.550	0.63
Coffee consumption	No	58(75%)	19(25%)	Reference	Reference	0.03*
	Yes	258(93%)	19(7%)	4.45(2.22-8.93)	3.79(1.11-12.97)	
Sweet meals consumption (sugar, chocolate etc.)	1-3 days/week	159(87%)	24(13%)	Reference	Reference	0.55
	4-7 days/week	63(95%)	3(5%)	3.17(0.92-10.90)	1.66(0.31-8.80)	
	Never	94(89%)	11(11%)	1.29(0.61-2.75)	0.95(0.28-3.27)	0.94
Presence of comorbidity	No	206(87%)	30(13%)	Reference	Reference	0.91
	Yes	110(93%)	8(7%)	13.75(6.71-28.18)	0.93(0.26-3.39)	
Frequency of Follow up	Every month	213(87%)	33(13%)	Reference	Reference	
	Every two month	55(98%)	1(2%)	8.52(1.14-63.69)	2.67(0.24-29.48)	0.42
	Every two weeks	48(92%)	4(8%)	1.86(0.63-5.50)	1.87(0.33-10.71)	0.48

Awareness of uncontrolled HTN harm Health	No	81(98%)	2(2%)	Reference	Reference	0.14
	Yes	235(87%)	36(13%)	0.16(0.04-0.68)	0.17(0.02-1.77)	
BMI(Kg/m^2)	18.5-24.9	129(83%)	26(17%)	Reference	Reference	
	≥25	171(94%)	11(6%)	3.13(1.49-6.57)	2.38(0.80-7.09)	0.12

Note: * indicates associated variable

1.1.7 Discussion

This study showed uncontrolled hypertension as an extremely serious public health concern. Beyond the half of the hypertensive patients on treatment follow up had poorly controlled blood pressure and the prevalence of uncontrolled BP found was (89%) of study participants which illustrated the challenges faced by the health care facilities in the Sheger city health system for the monitoring and follow-up of hypertensive patients. This rate of uncontrolled hypertension is in line with the study findings done in Morocco (82.8%)(46), and approximately a line with Nigeria (75.8%)(68), Democratic Republic of the Congo (77.5%)(69), South Africa (75.5%)(45), Zewditu Memorial Hospital, Ethiopia (69.9%)(11) and Zimbabwe (67.2%)(44). However, this is very higher than the findings reported from Israel (35.9%)(70) and Gondar university hospital, Ethiopia (37%)(10), Thailand (53.4%)(71), Kwazulu-Natal (51%)(72), South Asia (58.0%)(55), Ghana (57.7%)(73), Nigeria (53.6%)(74) and Jimma university hospital, Ethiopia (52.7%)(3). These discrepancies could be explained by differences in demographic,socio economic status, healthcare access factors and urbanization that bring hypertension to be difficult to control. Moreover, the difference in the study design,setting and sample size. Furthermore, the inconsistency may also be linked to differences in antihypertensive drug adherence rates and variations in the criteria utilized to classify hypertensive patients or operational definition as having uncontrolled or controlled BP. Most studies used the JNC7 guideline(2), which employed a cutoff value of > 140/90 for non-diabetic patients and > 130/80 for diabetic patients to define uncontrolled BP, and Some studies applied the European Society of Cardiology/European Society of Hypertension (ESC/ESH)(75) and the American College of Cardiology/American

Heart Association (ACC/ AHA) guidelines(62), which both lowered BP targets to 130/80 mmHg. Still, others utilized the new National Institute for Health and Care Excellence (NICE) guideline(76) , which still suggests a threshold and target blood pressure of 140/90 mmHg, but the current study followed the JNC8 guideline(78).

We identified the following factors that were positively associated with the lack of BP control: above standard consumption of alcohol, coffee and salt, inadequate grains, and no fruit eating habit and frequently fat consumption. In this study, hypertensive patients who did use reduced amount of salt to their food had 0.2 less likely at risk of odds uncontrolled BP compared to hypertensive patients who did not use reduced amount of salt in their food. This finding is consistent with studies fromin Ethiopia,by hospital based cross-sectional survey(51) and at three Afghan public hospitals in Afghanistan(40), which found that patients who used top-added salt on a plate were less likely to have optimal BP control than patients who did not use top-added salt. Studies from Zimbabwe(44) and Southern China(21) have also shown an association between salt consumption and BP. This can be explained by the fact that salt affects the body's natural sodium balance, leading to fluid retention and raising the pressure imposed by the blood on blood vessel walls, resulting in high blood pressure(78).Contrary to this evidence, some research, especially in specific populations, indicates that not everyone experiences elevated blood pressure with high salt intake. For example, a study conducted in Japan found that the link between salt consumption and hypertension may be less pronounced in populations that consume a lot of potassium-rich foods, which can counteract the effects of sodium. This variability suggests that individual dietary contexts, including the balance of other nutrients, can influence the sodium-blood pressure relationship. It underscores the complexity of dietary effects on health and emphasizes the necessity for personalized dietary recommendations. Alcohol consumption was another significant factor associated with uncontrolled BP. In this study, the odds of uncontrolled BP among hypertensive patients who consumed alcohol were 5.65 times greater compared to those of hypertensive patients did not drink. This finding is approximately similar to studies conducted in South Africa(45), Iran(79) at Jimma university, Ethiopia(3). Contradicting to this evidence, certain studies indicate no significant link between moderate alcohol consumption and hypertension. For example, a European cohort study found that moderate drinkers might have a lower risk of hypertension compared to non-drinkers, possibly due to the cardiovascular benefits of certain alcoholic beverages like red wine. These differing results may

be influenced by study design, demographic factors, or varying definitions of "moderate" drinking. Genetics may also affect how individuals metabolize alcohol and its impact on blood pressure.

Given these findings, healthcare providers should offer personalized dietary advice that considers each patient's unique circumstances, including lifestyle and genetics. Clinicians should educate patients about the risks of high salt and alcohol consumption while discussing the benefits of moderation. Addressing hypertension requires a comprehensive approach that includes not only dietary factors but also physical activity, stress management, and medication adherence for effective blood pressure control. Eating fruit was indicated to be a significant associated factor for controlling blood pressure among participants hypertensive patients. In this study, hypertensive patients who did have fruit eating habit had 0.03 less likely at risk of uncontrolled BP compared to hypertensive patients who did not have fruit eating habit. This finding was supported by studies conducted at University of Gondar referral hospital, northwest Ethiopia(51) & China(21). This due truth that fruits are low in cholesterol and saturated fat and high in dietary fiber, water composition, vitamins, carbohydrates, minerals which result in BP reduction. Aurguing to this evidence some studies done in Asian populations show that might find no significant impact of fruit intake on blood pressure, especially in populations that already consume a diet high in potassium or other beneficial nutrients.

While there are generally accepted benefits of increased fruit consumption and concerns regarding high saturated fat and caffeine intake, conflicting studies highlight the complexity of dietary influences on hypertension. A nuanced, individualized approach to dietary recommendations can optimize blood pressure management and overall health outcomes for hypertensive patients.

In this study, in compared to non-coffee-drinking hypertensive patients, habitual coffee users had 3.79 times the odds of having uncontrolled blood pressure. This is similar to a study conducted at Bishoftu, Ethiopia(30) and Spain(80) which showed habitual coffee consumption was statistically associated with uncontrolled BP in hypertensive patients. This may be due to Caffeine has been hypothesized to elevate blood pressure by several mechanisms, such as sympathetic over activity, adenosine receptor antagonism, elevated norepinephrine release by direct effects on the adrenal medulla, renal effects, and renin-angiotensin system activation.

Contradicting this, different studies have produced inconsistent findings about the relationship between blood pressure and coffee consumption which indicated a protective benefit of substantial coffee consumption controlling blood pressure, particularly in women(81,82). The nature of the association between coffee consumption and BP is still unclear, and further studies are required to establish the association between uncontrolled BP and habitual coffee consumption.

Also study finding revealed that hypertensive patients who were consume saturated fat 4-7 days/week had 16.52 times higher odds of uncontrolled BP compared to those who were consume 1-3 days/week and never were consumed. This finding is not agreement with studies done at else anywhere. However, it is in line with similar study done at Ardabil city in Iran(83) which reported a significant positive relationship between saturated fat intake and blood pressure and stated high fat diet increases the level of blood pressure. This is due to fact that consumes high saturated fat increases cholesterol level, promotes inflammation, and contributes to insulin hormone resistance. Also saturated fats may influence the renin-angiotensin system, which regulates blood pressure. Activation of this system can lead to vasoconstriction and increased blood pressure.

1.1.8 Limitations of the study

Lack of enough budgets also wass a challenging.Also there might be recall bias and social desirability bias since the behavioral practice of the study participants were based on self-reports and performance of these behaviors was not observed and could not be confirmed.However,we tried to minimized or reduced this by combine self-reports with objective measures to validate responses ,limit the time frame participants were asked to recall, and gave cues and conducted pilot studies were done.In addition, adherence to self-care activities and medications was measured by MMMAS score through self-reported interview, and this may cause recall bias and result in eliciting only socially acceptable responses and, hence, may underestimate medication adherence level.

Using proportion of uncontolled hypertension from Zewditu Memorial Hospital(P=0.7) to estimate sample size may affect the interpretation of results because the differences in healthcare systems, patient management, and community-specific factors, the prevalence of uncontrolled hypertension observed at Zewditu Memorial may not be generalizable to other public health facilities in Sheger City.

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1.1.9 Strength of this study

The study focuses on a specific population in Sheget City, providing relevant data that can inform local healthcare policies and interventions tailored to the community's needs. By incorporating various data collection methods (questionnaires, clinical measurements), the study can capture a holistic view of factors influencing hypertension control, including lifestyle, dietary habits. And understanding specific determinants associated with uncontrolled hypertension can help healthcare providers develop targeted interventions, such as dietary counseling or adherence support.

Also the study can contribute to the growing body of literature on hypertension management, particularly in under-researched regions or populations, thereby enhancing the overall understanding of hypertension epidemiology.

Morever, Involving patients in the study can foster a sense of ownership over their health, encouraging them to engage in discussions about their treatment and lifestyle choices.

Lastly,the findings can serve as a baseline for future longitudinal studies, allowing for the assessment of changes in hypertension management over time and the effectiveness of interventions implemented.

1.1.10 Conclusion

Uncontrolled hypertension is a major public health concern,as 89% of the respondents were found to have this condition.

Unhealthy lifestyle behaviors, such as alcohol consumption, high saturated fat intake, and coffee consuption,were identified as independent risk factors of uncontrolled hypertension.

Healthy lifestyle practices, including salt reduction, increased consumption of grains and fruits, were protective against uncontrolled hypertension.

1.1.11 Recommendation

For Individuals with Uncontrolled Hypertension

Limit Alcohol consumption**,** reduce Saturated Fat Intake, monitor Coffee Consumption**, p**ractice healthy Eating Habits**,** increase the consumption of whole grains and fruits, which can help lower blood pressure,implement salt reduction strategies to minimize sodium intake. And engage in regular physical Activity

Sheger city Health Office (Healthcare Providers)

Physicians, dietitians, and health educators should consider these factors when advising patients on lifestyle changes and give great attention for medication concerned issues.

Public Health Initiatives

To programs aimed at promoting healthy lifestyle choices in communities at risk for hypertension.

Strengthen community-based hypertension management programs that incorporate lifestyle modification components to help patients' better control their blood pressure.

Enhance primary care practices to ensure regular monitoring, medication adherence, and lifestyle counseling for patients with hypertension, especially among the older adult population.

Finally,further research could explore the long-term outcomes of patients who are non-adherent to medication over time.A longitudinal study would be beneficial in understanding the long-term effects of poor adherence on health outcomes.Additionally, qualitative studies could provide deeper insights into patients' perceptions and experiences with hypertension management

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CHAPTER TWO: OUTBREAK INVESTIGATION AND RESPONSE

2.1 Cholera Outbreak Investigation And Response At Haramaya Woreda, East Hararghe, Oromia Region, Ethiopia, 2023.

Abstract

Background: Cholera remains a disease of public health importance in Ethiopia associated with high morbidity and mortality. ORHB surge teams and EFELTP residents were deployed to investigate the outbreak with the objectives of verifying the diagnosis, identifying risk factors and make appropriate control measures to control the outbreak.

Methods: We conducted an unmatched case-control study. We defined a cholera case as any person aged 2 years or older presenting with acute watery diarrhea and severe dehydration or dying from acute watery diarrhea in Haramaya community and/or in areas where a cholera outbreak has been declared, any person presenting with or dying from acute watery diarrhea. We identified community controls. A total of 50 cases and 100 controls were recruited based laboratory and clinical findings. Structured questionnaires were administered to both cases and controls. One stool samples from case-patients and 14 water samples from the community water source were collected for laboratory investigation, and positive for vibrio cholrerae and E.coli. We performed univariate, bivariate& multivariate analysis using SPSS version 26.

Results: The median age of cases and controls was 12 and 14 years respectively. Females constituted 62 % (cases) and 51 %(controls). The attack rate was about 1.9 per/10,000 with a CFR of 4%.Drank from unprotected natural spring water (AOR 16.02, 95% CI: 6.02–30.06), eating raw vegetable (AOR 2.4, 95% CI: 2.10–6.80),were independent associated predictors.While, latrine usage OR: 0.79, 95% CI;0.351-1.785), use chlorine (OR 0.752,95%CI;0.378-1.497), having knowledge about cholera transmission AOR 0.21, 95% CI: 0.05–0.83), & Good hand hygiene (OR 0.527,95%CI:0.256-1.084) were found to be protective.

Conclusion & Recommendation: Vibrio cholerae was the cause of the outbreak in Haramaya. Drinking water from unprotected natural spring water, didn't use chlorine, lack of knowledge on ways of prevention and poor hand hygiene were significantly associated with the outbreak. We initiated hand hygiene and water treatment to control the outbreak.

Keywords: Unmatched case control study, cholera outbreak, Hand hygiene, spring water, Haramaya.

2.1.1 Introduction

Cholera is a diarrheal disease caused by the gram-negative bacterium vibrio cholerae,sero types 01 and 0139,affecting all age group of people.It is a vital measure of social development and continues to be a challenge in areas with limited access to safe drinking water and sanitation(1,2).The fecal-oral route is the means by which cholera is spread. Typically, a dose more than one million organisms is required to induce disease. The majority of cases of cholera are caused by contaminated food or water and rarely does transmission occur through touch, such as touching patients(3). Water may be contaminated at its source. Surface water and water from shallow wells are common sources of infection. Vibrio cholerae can live for years in certain aquatic environments. Water is frequently contaminated at home when inadequately washed hands come in contact with stored water. Bathing or washing cooking utensils in contaminated water can also transmit cholera(4). Cholera is frequently spread through moist grains that are served ambient temperature or not heated. Foods that have been cooked but are still somewhat contaminated after a few hours at room temperature create a perfect environment for Vibrio cholerae to flourish(5). Raw fruits and vegetables, raw shellfish, and raw or undercooked seafood are additional items that can spread cholera. Through the waste products, cholera patient corpses are extremely contagious. While attending funerals, physical touch is another important media. Cholera treatment centers (CTC) can become major sources of contamination if sanitation measures are inadequate.Acififying foods can help inhibit the growth of vibrio cholerae.(6).

2.1.2 Statement of the Problem

Cholera remains a global threat to public health. It disproportionally impacts the poorest and most vulnerable populations(12). New outbreaks can occur in any part of the world where water supply, sanitation, food safety and hygiene are inadequate. The risk of cholera is considerably increased in humanitarian emergencies, when there are significant population movements and crowding in sites where displaced persons gather and frequent disruption of, or inadequate, access to healthcare services, clean water, sanitation and hygiene. Because the incubation period of cholera is short (2 hours to 5 days), the number of cases can rise quickly and many deaths can occur, creating an acute public health problem(8). Spread area with poor sanitation, limited access to safe water and deficient hygiene practices are at high risk for cholera transmission. In addition, limited access to health care facilities and inadequate treatment of cases are factors associated with high cholera-related mortality. If unable to treated CFR may beyond 50%.. From its original reservoir in the Ganges delta in India, cholera spread throughout the world during the 19th century, killing millions of people in six

subsequent pandemics that struck every continent(13). The current (seventh) pandemic began in South Asia in 1961 and spread to Africa in 1971 and the Americas in 1991(14). Cholera is now endemic in many countries, and while it can be fatal, it is easily preventable and treated.

According to predictions from the World Health Organization (WHO), an estimated 2.86 million cholera cases (uncertainty range: 1.3m-4.0m) occur annually in endemic countries. Among these cases, there are an estimated 95,000 deaths (uncertainty range: 21,000-143,000)(13).

Even though water and sewage treatment systems have mostly eradicated cholera from industrialized nations more than a century ago, the majority of cases and deaths of cholera worldwide in the 20th first century are found in sub-sahara Africa and also endemic too(7–9). Case Fatality Ratio (CFR)remains consistently above the WHO-recommended 1% (yearly average of 2.2%), with an average of 23 countries affected yearly(7,10). 14 African nations reported more than 213 443 cases and 3951 deaths (CFR, 1.9%) from the disease between 1 January 2022 and 16 July 2023(10). Numerous cholera cases and outbreaks that might spread across nations have a significant impact on the region. Africa continues to have a greater rate of reported cholera case deaths than any other continent. This illustrates how cholera's straightforward rehydration therapy treatment contributes to a lack of access to basic health care(10).

In Ethiopia 26,398 cholera cases including 362 deaths reported between 27 August 2022 and 1 November 2023(3,11).The majority of cases are reported from Oromia region followed by South Ethiopia,Amhara,Somali,Sidama,Afar,Central Ethiopia, Diredawa,Benishangulgumz and Harari.

Africa was primarily affected by the seventh pandemic of cholera, which is currently affecting the world. Even after cholera made a comeback in Africa in 1970, over 40 years later, the infection continues to represent a serious problem to public health. It is marked by a high case fatality rate, recurrent outbreaks, endemicity, and high rates of infection rates, especially in the area around the central African Great Lakes, which may serve as cholera reservoirs. Cases happen there all year round, with the rainy season seeing an increase in occurrence. In other parts of sub-Saharan Africa, cholera outbreaks are often of varied sizes, and there is always a chance that they could spread widely(14–16).

Even though water and sewage treatment systems have mostly eradicated cholera from industrialized nations more than a century ago, the disease is still a major source of illness and mortality in many African nations(17). The majority of cases of cholera worldwide 20th century are found in Sub-Saharan Africa. Numerous cholera cases and outbreaks that might

spread across nations have a significant impact on the region. Africa continues to have a greater rate of reported cholera case deaths than any other continent. This illustrates how cholera's straightforward rehydration therapy treatment contributes to limited access to basic health services. Improving primary healthcare as well as prevention through better water and sanitation systems are two issues that many African nations must simultaneously address(7).

In 2019,the World Health Organization(WHO) reported a global age-standardized cholera mortality rate of 1.66 per 100,000 for males and 1.60 for females, with the highest rates in the African Region (12.29 in males,10.53 in females) and the Eastern Mediterranean Region(2.92 in males,3.17 in females(9).

Between August 27, 2022, and November 1, 2023, there were about 26,600 cases of cholera reported throughout Afar, Amhara, Benishangul Gumz, Central Ethiopia, Dire Dawa, Harari, Oromia, SER, Sidama, Somalia, and Tigray. Out of these 357 deaths and1.34% CFR were reported. The cholera outbreak is being made worse by drought-like conditions in southern Tigray, eastern Amhara and East Hararge, and flood occurrences in Somalia and Dire Dawa, necessitating an increase in WASH response(16).

The lack of funds, the presence of few partners (particularly WASH partners in the Somali, SNNP, and Sidama Regions), the scarcity of OCV doses and cholera treatment kits, the scarcity of water quality test kits and training on water quality testing to zonal water staff, the lack of reservoir tanks, ambulances, and medical supplies, the lack of technical expertise in cholera case management, the scarcity of WASH services and limited distribution of WASH items, and difficulties with community outreach continue to impede the response scale-up. Engagement of development partners is needed to enhance community resilience and address the root causes of outbreaks(18).

All the regions indicate the need for more technical assistance, enhancing the skills of health workers to effective management, conduct active surveillance, reporting and cholera case management to be integrated in all response locations. Moreover, logistics support remains weak in most of cholera affected areas, mainly to transport supplies and personnel to the affected areas to monitor and conduct surveillance activities and case searching(18).

The sense of urgency is missing. Cholera remains a very infectious and seriously lethal disease,that easily prevented and treated, if appropriate interventions are in place. Additional funding are required to scale-up the response to the current outbreak, as well as to address the root causes of recurrent cholera outbreaks by building-up linkages with NEXUS partners, as well as of other water-borne diseases, through the construction and maintenance of appropriate drink water supply schemes, including systemic quality control. In addition, the

low utilization rate of latrines and continued open defecation need to be urgently addressed. At the moment, there is no money available to compensate health professionals for their efforts in controlling cholera at the woreda and facility levels. This can become an issue if the outbreak is not quickly controlled. In similar fashion, the inability to raise the necessary funding hinders the implementation of cholera preparedness measures in woredas that have not yet been affected, including health worker training and the prepositioning of WASH and medical supplies. It is still crucial to work with the local leadership to implement both short- and long-term cholera outbreak interventions(18).

2.1.3 Significance of the study

As cholera cases was reported from all regions Ethiopia,Oromia regions as well as East Hararghe zone started to reported suspected and confirmed case since December 29/2023 from Awumera kebele,East Hararghe zone. This investigation helped East Hararghe zone PHEM, policy makers to knew source, causative agents and overcome or hangle widely dissemination of the infection. Thus, this study aimed to describe the mortality and morbidity distribution of the outbreak and implement control measures.

2.1.4 Objective

2.1.4.1 General objective

- To describe the cholera cases by time, person, places, determine potential detrimental factors and preventive methods implemented in Haramaya woreda,East Hararghe zone, Oromia, Ethiopia, from 28 August to 17 October,2023.

2.1.4.2 Specific objective

- To explain the cholera cases by time, places and person.
- To determine potential risk factors
- To describe outbreak control measures

2.1.5 Methods

2.1.5.1 Study location

The study was conducted in Haramaya woreda at the Cholera Treatment Unit (CTU) and in communities in the catchment area of the health facilities. East Hararghe Zone is located 530 km far from Addis Ababa, capital city of Ethiopia. The total estimated population of the woreda was 267,558 of these 129,792 men and 137,766 women by 2023. Haramaya has a population density of 151.87. According to a May 24, 2004 World Bank memorandum, 16.5% of the inhabitants of Haramaya woreda have access to electricity, this woreda has a road density of 39.6 kilometers per 1000 square kilometers (compared to the national average of 30 kilometers), the average rural household has 0.5 hectare of land (compared to the

national average of 1.01 hectare of land and an average of 1.14 for the Oromia Region). 13% of the population is in non-farm related jobs, compared to the national average of 25% and a Regional average of 24%. Concerning 53% of all eligible children are enrolled in primary school, and 10% in secondary schools. Concerning 44% of the zone is exposed to and none to . The memorandum gave this woreda a drought risk rating of 367.Haramaya woreda Health is accountable for guiding the health sector and managing health emergencies.

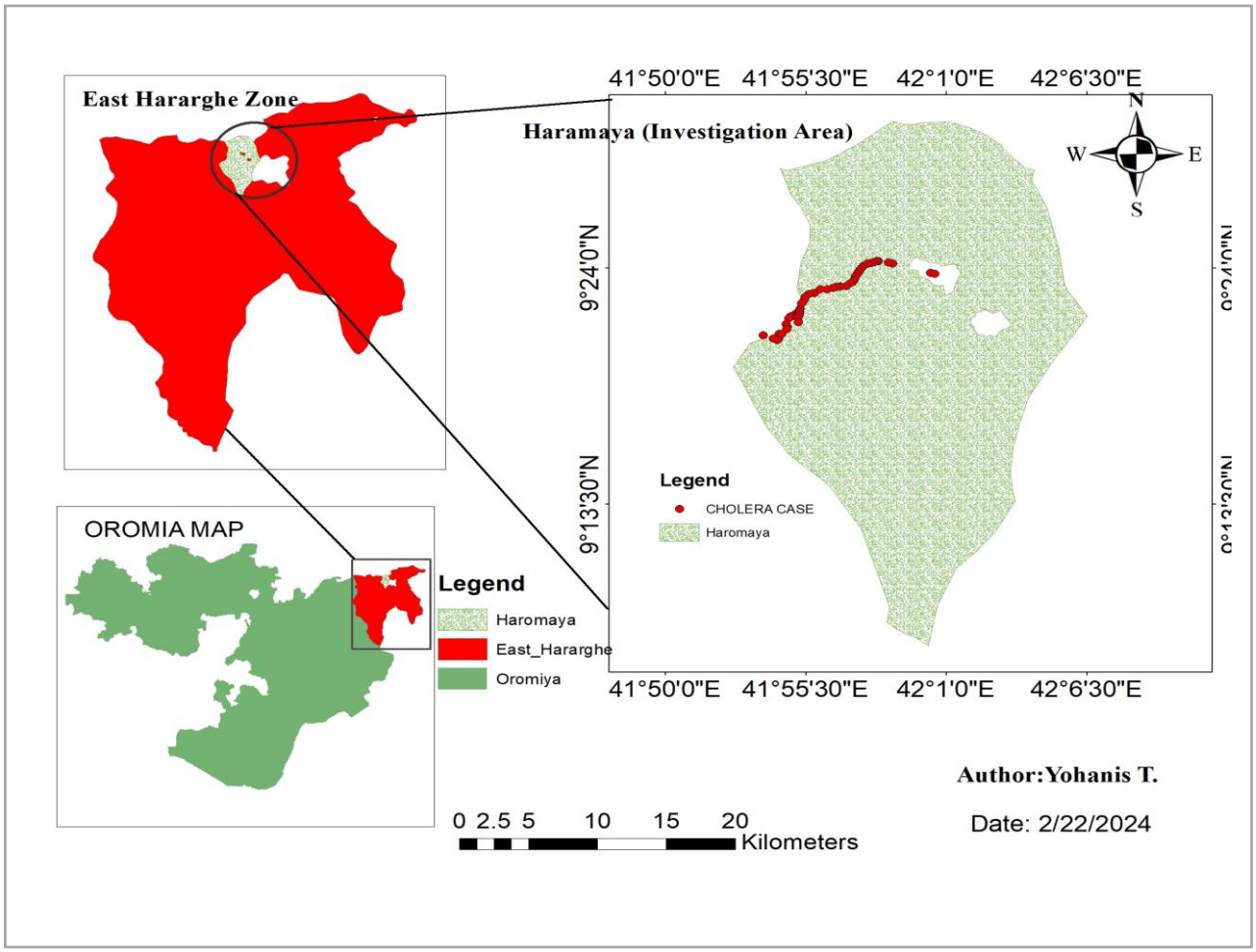

Figure 5: Map of Cholera Investigation Area

2.1.5.2 Study period

The investigation took place between 29 August to 17 October 2023.

2.1.5.3 Study Design

We used community based unmatched case-control study .

2.1.5.4 Definition and Case definition

2.1.5.4.1 Suspected Cholera case:

- In areas where a cholera outbreak has not yet been declared, any person aged 2 years or older presenting with acute watery diarrhea and severe dehydration or dying from acute watery diarrhea.
- In areas where a cholera outbreak has been declared, any person presenting with or dying from acute watery diarrhea.

2.1.5.4.2 Confirmed cases:

- A suspected case in which Vibrio cholerae O1 or O139 has been isolated in the stool.

Admitted to Hospital and health center CTU between 29 August to 17 October 2023), to be included in the study, patients had to be the first person in the household with diarrhea since the start of the outbreak in Haramaya woreda (August, 2023). We defined 5 days before clinical signs and symptoms (for case-patients) or before selection (for controls) was our definition of the referent exposure duration.

2.1.5.5 Inclusion and exclusion criteria

2.1.5.5.1 Case Enrollment

Field staff reviewed the discharge/observation area of Haramaya woreda at health facilities CTU to identify case-patients. Those consenting to participate in the study were then enrolled and interviewed. Trained health profession interviewed case-patients (or parents/guardians if case patient was < 15 years old) in the CTU/Community in Haramaya woreda using a standardized questionnaire. Their residential location (e.g., street addresses) in the 5 days before illness onset was ascertained to enable household observations and facilitate control recruitment.

2.1.5.5.2 Control Enrollment

Two well (non-ill) neighborhood controls were systematically selected for each case. Beginning at the case-patient's home, field staff set the point and one enumerator proceeded to the second nearest house or compound in that direction and another enumerator walked to the second nearest house or compound in the opposite direction. At each house, field staff inquired whether any residents had had diarrhea since 28 August, 2023 (date of first case of cholera reported in Haramaya woreda); households with diarrhea cases on or after August 28 were excluded. In the eligible households, persons were enrolled as controls if they were of the same age category as the patient, and lived at that residence during the 5 days before symptom onset in the patient to whom they were matched. If the control subject was not at home, that home was revisited afternoon or the following days. If this person could not be contacted at two return visits, field staff excluded that potential control.

2.1.5.6 Data Collection Tools and Procedures

A structured questionnaire was developed after hypothesis-generating interviews, and was used to interview both case-patients and controls. The questionnaire was developed in English (Appendix A) but enumerators administered the questionnaire verbally in Haramaya woreda. They were trained before launching the study to ensure consistency in language used and how questions were asked. Before administration, the questionnaire was pilot tested on 17 participants in Maya town, a non-study community. Case-patients were asked about exposures in the 5 days before illness onset and controls were asked about exposures in the same 5-day period as the matched case-patient. GIS coordinates of home and water sources were measured using a Geopoint service(GPS) device/app on mobile phone/.

2.1.5.7 Study Variables

2.1.5.7.1 Dependent variable

Cholera status (case versus control)

2.1.5.7.2 Independent variables

Socio-demographic characteristic: (age, sex, marital status, religion, ethnicity, occupation, income, educational status, and residence), knowledge, water source exposure and water treatment**,**food and beverage exposures in the 5 days before illness, access to sanitation; latrine usage, hand washing practice, cholera knowledge and treatment; and knowledge, availability, and utilization of ORS(Oral rehydration service)**,** free chlorine residual status**,**vaccination status.

2.1.5.8 Operational definition

A confirmed case: In which vibrio cholerae 01 or 0139 has been identified in the stool sample.

Epidemiologically linkage case:- Is suspected case that has had contact with confirmed case.

2.1.5.9 Data Quality Assurance

The data was cleaned,checked for missing,and recorrected before analysis.

2.1.5.10 Data Analysis

Data were entered into an MS-Excel 2010 and later exported to SPSS, cleaned and analyzed. Exposures of cases and controls were compared to yield crude odds ratios (CORs), adjusted odd ratio(AOR) and 95% confidence limits using bivariate, multivariate analysis respectively. Conditional logistic regression was performed to create a multivariate model that examined interactions and the impact of confounding variables.

2.1.5.11 Ethical Consideration

Oromia Health Bureau authorized the local investigation and response of the outbreak. Verbal informed consent was obtained from participants, and personal identification information was excluded from the report.

2.1.5.12 Dissemination of the result

This study report has been submitted to Oromia Regional Health Bureau, Addis Ababa Univesity School of Public Health, East Hararghe Zonal Health Department and Haramaya woreda Health Office.

2.1.6 Result

2.1.6.1 Descriptive findings

2.1.6.1.1 Cases description by time

A total of 50 cholera cases were recorded almost within three weeks, from August,28-October 17/2023 from six kebeles, namely:Awumera,Awumera Qarsa ,Kersa Gatata,Gobile Qirixa,Qarsa Qajima,Waltaha Bilisuma.Out of the cases, the most of them 34(68 %) were from Awumera kebele as depicted in (Figure 6).

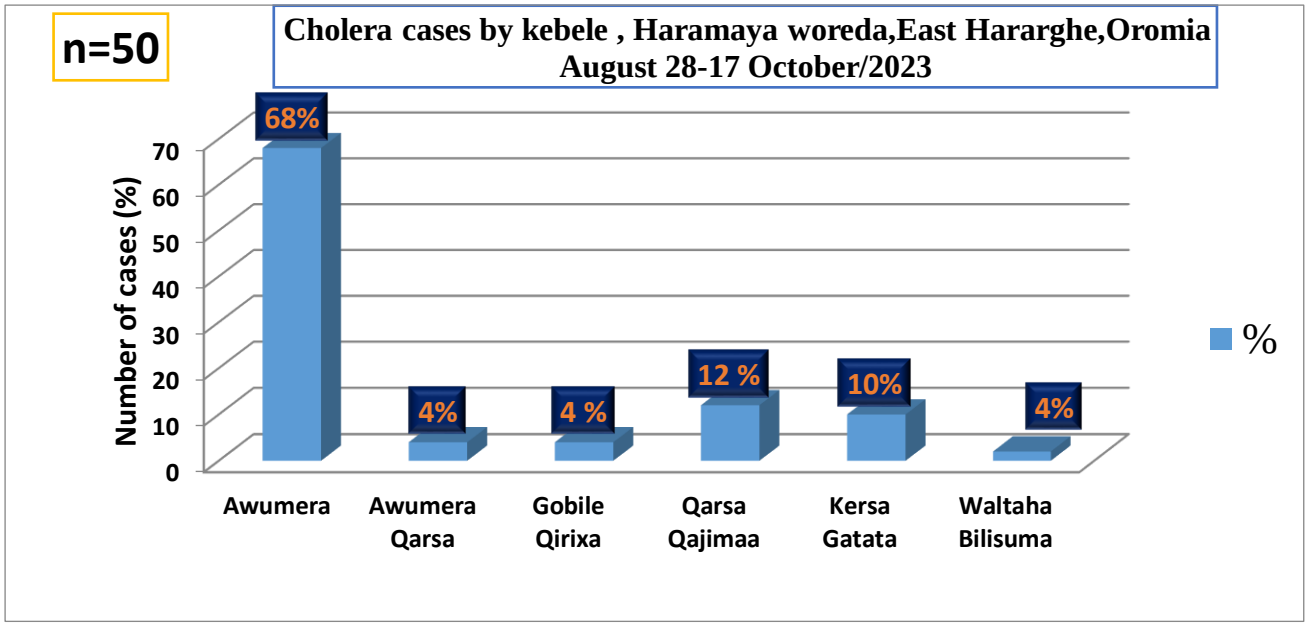

Figure 6:Distribution of cholera case by place in Haramaya Woreda.

2.1.6.1.2 Description of cases by time

A outbreak began on 28 August 2023 reaching its peak at 29 August 2023 and continues up to 17 October, 2023 (Figure 7). A female 30 years old index case was notified on August 28, 2023 from Awumera Kebele, Rare village and seen at Awumera health center. She was admitted to Cholera treatment center (CTC) on same date. She drank on 25 August /2023 fecal contaminated water from unprotected natural spring around their home, which give

service for that village, but she did not have history of contact with cholera suspected person and of travel to cholera affected areas five days before his onset of illness. She experienced acute watery diarrhea, vomiting and dehydration, with isolation of Vibrio cholerae from his stool sample. In addition, the water sample collected from where she drank wells water was found to be Vibrio cholerae positive. She was discharged on 7 October /2023 following his recovery.

The epidemic curve (Figure 7) indicated that the outbreak started on 28/8/2023 and rapidly increased on 29/8/ 2023 when 9 cases were reported. There were 5 peaks during the outbreak in the period under study (From 28 August to 17 October, 2023).

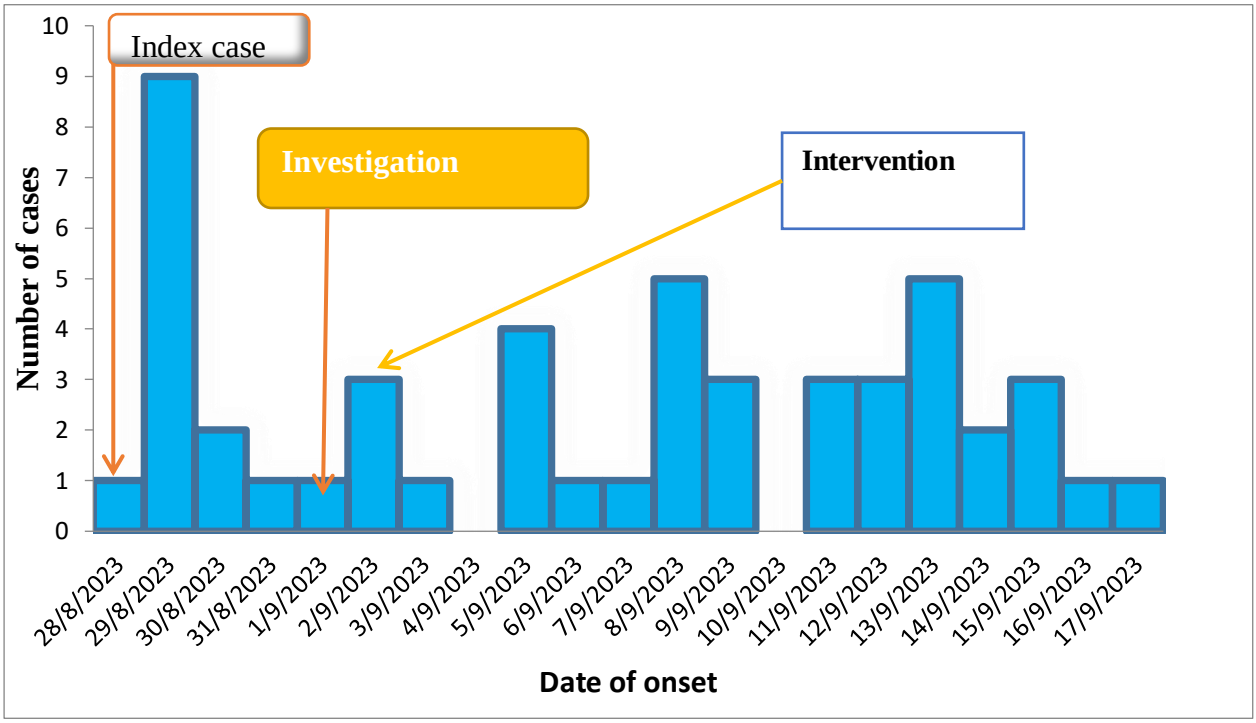

Figure 7:Cholera cases from 28 August to 17 October, 2023,Haramaya Woreda, East Hararghe,Oromia,Ethiopia

2.1.6.1.3 Description of cases by person

Females were more affected by a maximum AR of 2.1/10,000, and those who were between the ages of 5-15 years were also more influenced with AR of 3.3/10,000 and the cases were low in 16-30 years groups which was 0.7/10,000 attack rate(AR). The crude AR among the total at-risk population was 1.9 per 10,000 during the week of the outbreak investigation (Table 5).

Table 5:Distribution of cholera case by Person Haramaya Woreda,East Hararghe Zone from August 28 -October 17 /2023

Category	At risk population	Number of cases	AR/10,000	CFR (%)
Sex				
Male	129,792	19	1.5	5
Female	137,766	31	2.1	3
Total	**267,558**	**50**	**3.6**	**4**
Age Category				
2-4 years	42809	6	1.4	
5-15 years	82,943	27	3.3	
16-30years	74,916	5	0.7	
31-45 years	34,783	7	2.0	
> 45 years	29,431	5	1.7	
Total	**267,558**	**50**	**1.9**	

2.1.6.1.4 Characteristics of cases and controls

All 50 cases and 100 controls were asked about various variables like, water source for drinking , health seeking behavior, knowledge of cholera transmission, ways of prevention,vaccination status, contact history, travel history,occupational status and level of education during outbreak investigation. As we compared cases with controls by knowledge, attitude and practice, majority of both of them (90%) were received information about cholera by once a week and per two weeks ago.From those have heard about cholera majority of the cases (48%) and 45% controls have got the information from health workers (HWs),28% cases and 15% of controls from family members(Figure 10). 82% of the cases and 91% of controls had known how to get cholera disease. Majorities of cases' 28 % were uneducated than control and from the total,56% of cases were students(Figure 8,Figure 9).

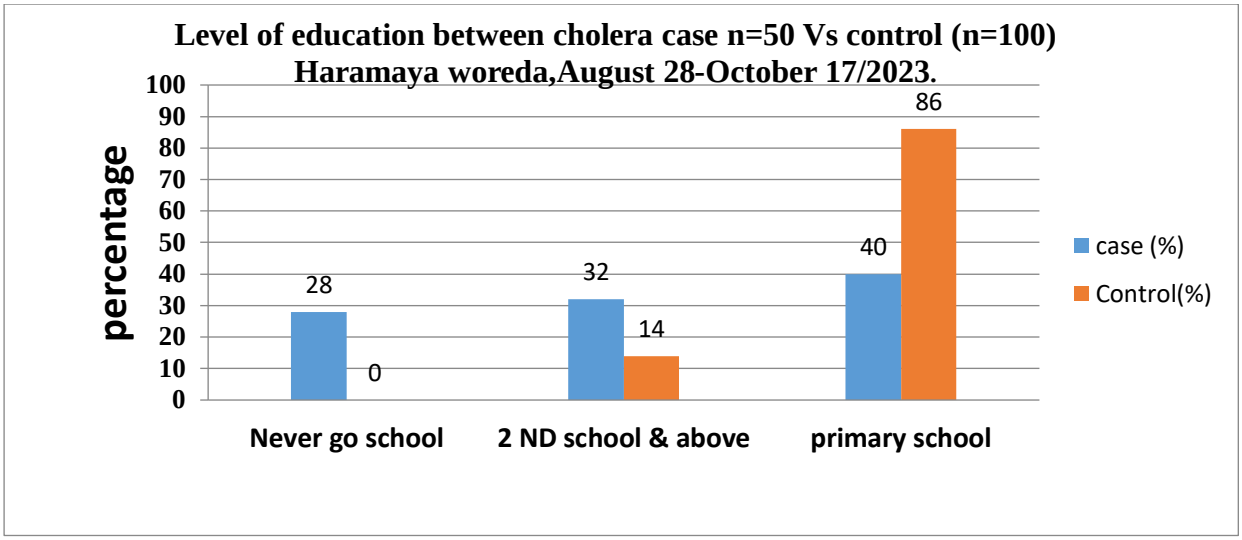

Figure 8:Levels of education between Cases and controls at Haramaya woreda,East Hararghe Zone from August 28-October 17,2023.

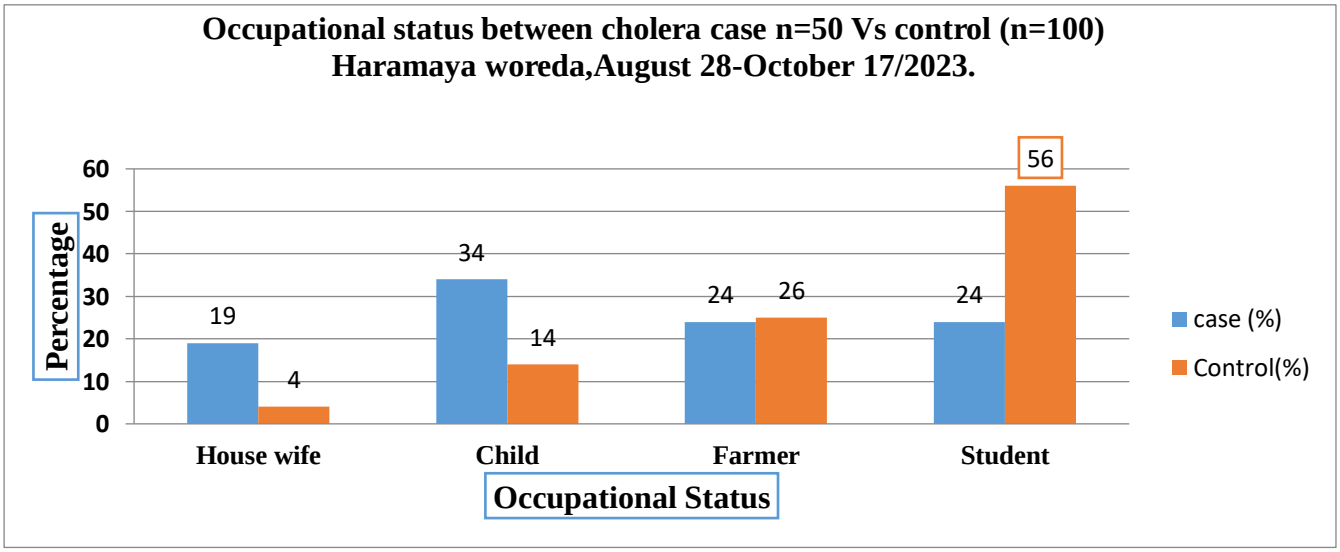

Figure 9:Occupational status between Cases and controls at Haramaya Woreda,East Hararghe Zone from August 28-October 17,2023.

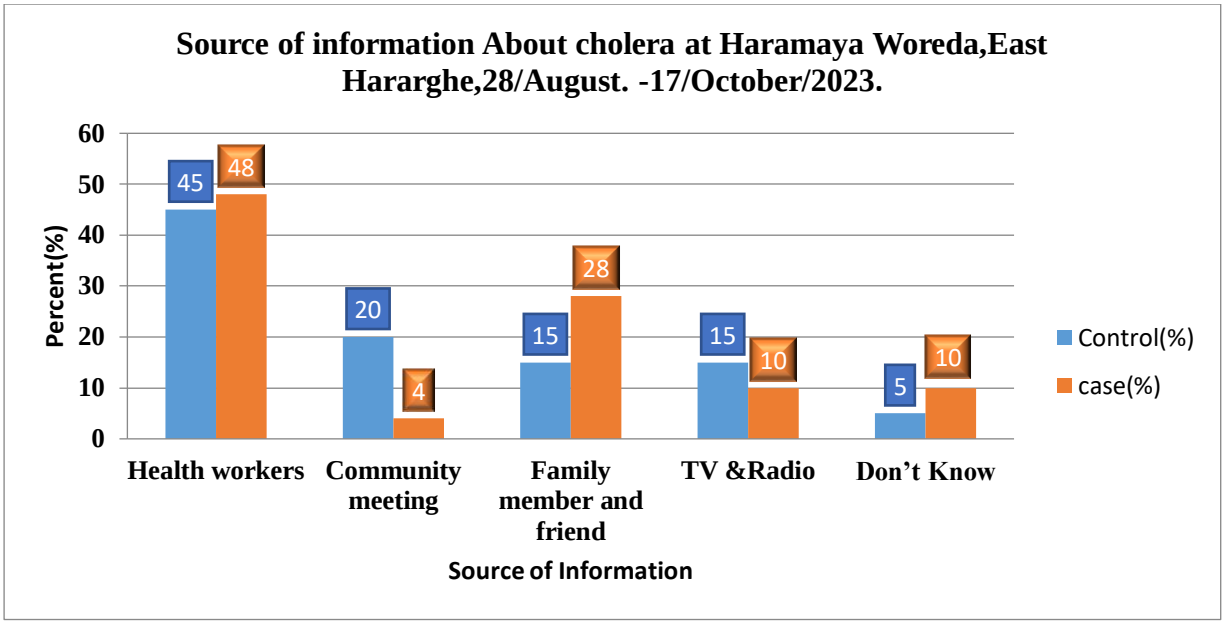

Figure 10:Source of information About cholera at Haramaya woreda,East Hararghe Zone from August 28 to October/17,2023

When we conducted chlorine test of their drinking water at house hold level, majority of cases' drinking water (80%) negative for chlorine. But that of controls 84 % positive for chlorine. When we assessed the attitude and practice of cases and controls, from cases 35(70%) of them did used wells ,13(26%) spring,7(14%) river water for drinking purpose ,while 24(24%) 0f control used wells,81(81%) spring,16(16%) drank river water. The 76% and 80% of the cases and controls respectively had used open defecation (didn't use latrine).Majority of cases (60%) and controls(74%) didn't practice hand washing with soap after toilet(Figure 11,Figure 12).

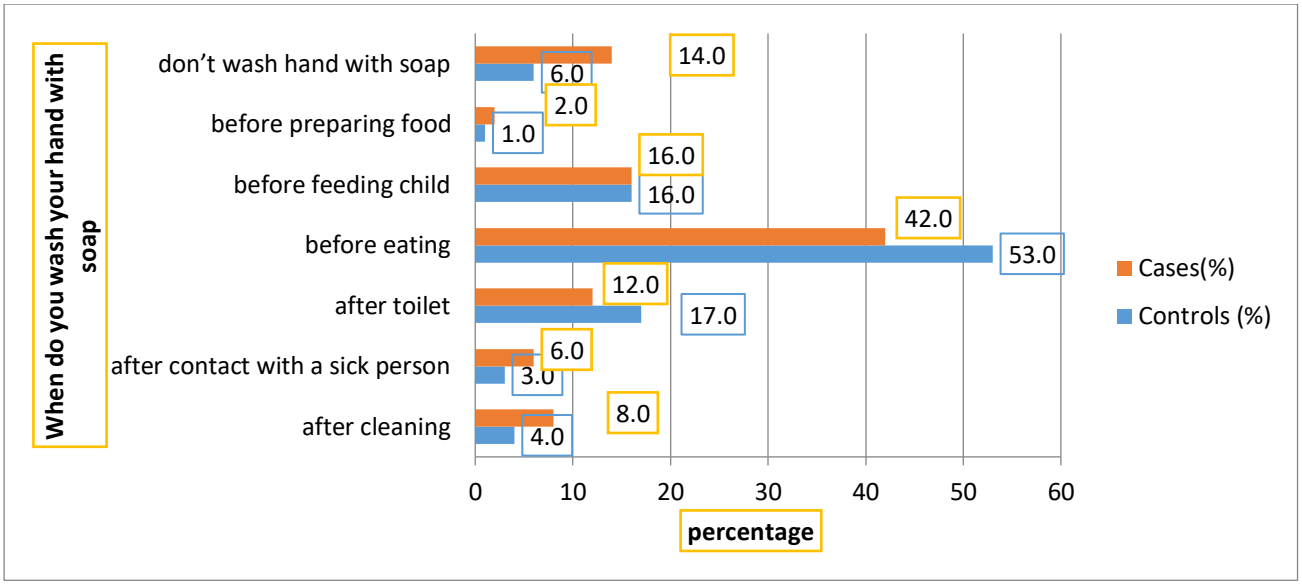

Figure 11:Hand washing practice at Haramaya woreda,East Hararghe Zone from August 28-October 17 /2023

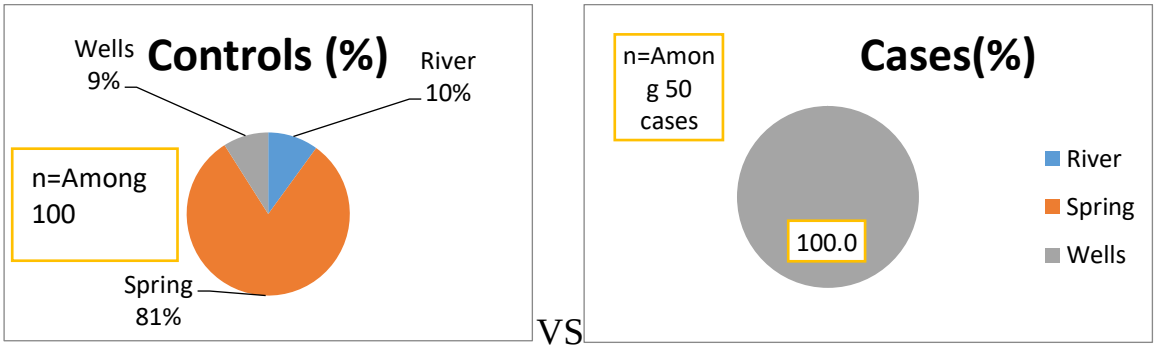

Figure 12:Source of drinking water between Cases vs controls at Haramaya woreda,East Hararghe Zone from August 28-October 17 /2023

2.1.6.1.5 Analytical Epidemiology

An unmatched study recruited 50 cases with median age of 12 and 100 controls with a median age of 14.Females made up 60%(n=30) of cases and 51% (n=51)of controlsTable 6).

Table 6:**Demographic characteristics of cholera cases and controls at Haramaya ,East Hararghe, Ethiopia: August 28-October 17/2023.(Univariate Analysis)**

Socio-demographic characteristics variables	**Category**	**Cases(N=50)**	**Control(N=100)**	**P-value**
Age(years) without category	Mean	18.60	19.60	
	Median	12	14	
	Mode	8	14	
	Range	2-60	2-60	
	SD	16.42	14.90	
Age (years)	2–4	6(12.0%)	11(11.0%)	0.968
	5–15	27(54.0%)	52(52.0%)	
	16–30	5(10.0%)	12(12.0%)	
	31–45	7(14.0%)	14(14.0%)	
	Above 45	5(10.0%)	11(11.0%)	
SEX	Male	19(38%)	49(49%)	0.202
	Female	31(62%)	51(51%)	
Educational Status	primary school	20(40%)	86(86%)	<0.001
	secondary school	14(28%)	6(6%)	
	college or above	2(4%)	0(0%)	
	Never go school	14(28%)	8(8%)	
Occupation	Student	28(56%)	24(24%)	<0.001
	Farmer	13(26%)	24(24%)	
	house wife	2(4%)	34(34%)	
	Child	7(14%)	18(18%)	

Almost all of the cases were showed sign and symptoms of cholera case. All cases had waterly diarrhea 50 (100%), vomiting 43 (86%), and nausea 15 (30%) and no one developed leg cramps and abdominal pain. All of them visited health facility and admitted cholera treatment center (CTC)(Table 7).

Table 7:Frequency of clinical signs and symptoms for cholera case patients,Haramaya, 2023

Sign & Symptoms	**No.of cases(%)**
Water Diarrhea	50(100)
Vomiting	43(86)
Nausea	15(30)
leg pain	0(0)
Abdominal pain	10(20)
Chills	5(10)
Fatique	17(34)

All cases were admitted to CTC and there was one death. A majority of the cases were students.The cases and controls had similar distrubutions in sex, agge, and educational status**(**Table 6).Laboratory confirmed vibrio cholerae 01 serotype of ogawa.

On bivariate analysis for factors; chance of getting cholera was lesser in households with latrine (protective factors), 0.792 [0.952-4.554] than compared with households with no latrine ,odds who had travelled history 0.49 less likely to had cholera than odds of non – ill/control/ who didn't travel. Also the like hoods of getting cholera were lesser among odds positively tested for chlorine **0**.752[0.378-1.497],ate fruit 0.649[0.243-1.732], raw meat 0.552[0.175-1.740],use different methods to cleaning water 0.531[0.246-1.148],hand washing with soaps after toilet 0.527[0.256-1.084],drank wells water 0.135[0.063-2.89**],**being farmer **0**.316[0.154-0.649],being child 0.020[0.006-0.063],being house wife 0.068[0.021-0.215] than odds negatively tested for chlorine, didn't eat fruit, raw meat, didn't use different methods to clean water, didn't wash hand with soap after toilet, didn't drink wells water, not being farmer, being not child, not being house wife respectively .However, except Wells water (**P-value<0.001)**,being farmer (P-value=0.002,being child(**P-value <0.001)**, being house wife

(**P-value<0.001)** and raw vegetables **1.9 [1.6-3.5] P-value <0.001)**,none of them statistically did not significant. Reversely, odds getting cholera was about 1.17 higher people exposed to drank river water than non-exposed, about 12 higher people exposed to drank spring water than non-exposed, 2 times higher among un vaccinated than vaccinated, about 1.6 higher in male than female, about 1.1 in age ≥ 30 years old than age < 30 years old, 1.22 times among students and 1.537 times higher in primary school. But only spring water was statistically associated **(**Table 8**).**

Table 8:Bivariable analysis for comparing exposures characteristics of cholera outbreak among cases and controls,Haramaya woreda,East Hararghe,Oromia,from August 28 October 17, 2023

Exposures			Control(%)	Case(%)	COR(95%CI)	P-value
Travel history	No		98(98)	48(96)	1	0.482
	Yes		2(2)	2(4)	0.490[0.067-3.584]	
Water sources exposures	River	No	84(84)	43(86)	1	0.749
		Yes	16(16)	7(14)	1.17[0.447-3.060]	
	spring	No	19(19)	37(74)	1	0.000***
		Yes	81(81)	13(26)	**12.134[5.422-27.154**	
	Well	No	76(76)	15(30)	1	0.000***
		Yes	24(24)	35(70)	**0.135[0.063-2.89]**	
Test chlorine in drinking water during observation	Negative		53(53)	30(60)	1	0.417
	Positive		47(47)	20(40)	**0.752[0.378-1.497]**	
Food exposures	Raw or un heated vegetable	No	92(92)	23(23)	1	0.000***
		Yes	8(8)	27(27)	**1.9 [1.6-3.5]**	
	fruits	No	89(89)	42(84)	1	0.388
		Yes	11(11)	8(16)	0.649[0.243-1.732]	

	Raw meat	No	93(93)	44(88)	1	
		Yes	7(7)	6(12)	0.552[0.175-1.740]	0.552
Latrines usage	No		80(80)	38(76)	1	
	Yes		20(20)	12(24)	0.792[0.351-1.785]	0.573
Vaccination status	Unknown		1(1)	1(2)	1	
	No		89(89)	42(84)	2.119[0.129-34.707]	0.599
	Yes		10(10)	7(14)	1.429[0.076-26.895]	0.812
Age groups	2-30 Years		75(75)	38(76)	1	
	>30years & above		25(25)	12(24)	1.056[0.478-2.329]	0.893
Sex	Female		51(51)	31(62)	1	
	Male		49(49)	19(38)	1.568[0.784-3.134]	0.203**
Different methods for cleaning water	No		80(80)	34(68)	1	
	Yes		20(20)	16(32)	0.531[0.246-1.148]	0.107**
Washing hand with soap after toilet	No		74(74)	30(60)	1	
	Yes		26(26)	20(20)	0.527[0.256-1.084]	0.082**
Knowledge ways of cholera prevention	No		91(91)	41(82)	1	
	Yes		9(9)	9(18)	0.451[0.167-1.218	0.116**
Level of education	Primary school	No	14(14)	10(10)	1	
		Yes	86(86)	40(40)	1.537[0.628-3.755]	0.347
	Secondary school & above	No	77(77)	17(34)	1	
		Yes	33(33)	33(66)	0.154[0.073-0.325]	0.000***
	Student	No	45(45)	25(25)	1	
		Yes	55(55)	25(25)	1.222[0.619-2.413]	0.563

Occupational status	Farmer	No	76(76)	25(25)	1	
		Yes	24(24)	25(25)	0.316[0.154-0.649]	0.002***
	Child(no work)	No	96(96)	16(32)	1	
		Yes	4(4)	34(68)	0.020[0.006-0.063]	0.000***
	House wife	No	96(96)	31(62)	1	
		Yes	4(4)	19(38)	0.068[0.021-0.215]	0.000***
Note: 95% Confidence interval, *** has significantly associated variables , candidate variable too and ** candidate variable with **p≤0.25** in bivariable were included in multivariate logistic regression analysis..						

In multivariable analysis, drinking spring water (AOR: **16.02, 95 % CI,6.01-30.06),** eating raw vegetables(AOR: **2.4 95%CI [2.1-6.80]** were pinpointed as associated independent risk factors whereas washing hand with soap after toilet(AOR:**0.443,95%CI,0.150-1.308]**,Knowledge ways of cholera prevention (AOR:**0.211,[95%CI,0.054-0.835]** were independent protective factor (Table 9).

Table 9: Multivariable analysis for comparing exposures characteristics of cholera outbreak among cases and controls,Haramaya woreda,East Hararghe ,Oromia, August 28-October 17,2023.

Exposures			Control (%)	Case (%)	COR(95%CI)	AOR(95%CI)	P-Value
Water sources exposures	Spring	No	19(19)	37(74)	1	1	
		Yes	81(81)	13(26)	**12.134[5.422-27.154**	**16.02[6.01-30.06]**	0.005***
Food exposures	Raw Vegetables	No	92(92)	23(23)	1	1	
		Yes	8(8)	27(27)	**1.9 [1.6-3.5]**	**2.4 [2.1-6.80]**	0.009***
Knowledge ways of cholera prevention	No		91(91)	41(82)	1	**1**	
	Yes		9(9)	9(18)	0.451[0.167-1.218	**0.211[0.054-0.835]**	0.027***
Different	No		80(80)	34(68)	1	**1**	

methods for cleaning water	Yes		20(20)	16(32)	0.531[0.246-1.148]	**0.626[0.005-85.34]**	0.852
Sex	Female		51(51)	31(62)	1	**1**	0.574
	Male		49(49)	19(38)	1.568[0.784-3.134]	**0.493[0.042-5.819]**	
Washing handwithsoap after toilet	No		74(74)	30(60)	1	**1**	0.377
	Yes		26(26)	20(20)	0.527[0.256-1.084]	**0.331[0.029-3.840]**	
Occupational status	Farmer	No	76(76)	25(25)	1	**1**	0.775
		Yes	24(24)	25(25)	0.316[0.154-0.649]	**0.458[0.002-97.86]**	
	House wife	No	96(96)	31(62)	1	1	0.68
		Yes	4(4)	19(38)	0.068[0.021-0.215]	0.081[0.001-0.86]	
Level of Education	Secondary school &above	No	77(77)	17(34)	1	**1**	0.389
		Yes	33(33)	33(66)	0.154[0.073-0.325]	**3.687[0.189-71.764]**	
95% Confidence interval, *** has significantly associated variables							

2.1.6.1.6 Intervention/ Response/ done

During the outbreak response, multiple teams gathered various logistics,drugs, and matearials were mobilizedto health facilities for interventions: such as cars,CTC and its kit, doxycycline, fluids(RL, saline),chlorine, soap, ORS, Berakina and potable water were given for the woreda. Household Water treatment was distributed (17588 Aqua tab, 15321 of bishan gari).1711 new latrines were constructed. The deployed team performed monitoring and evaluation to filled skill gaps.Also we conducted active case searches house to house and all suspected cholera cases were referred to nearby health facilities. Cholera cases were treated with, oral rehydration salt (ORS) for preventing dehydration until reached cholera treatment center (CTC) and to reduce morbidity and mortality. Routine surveillance system was sustained and closely monitored daily at all levels. Socaial mobilization and advocacy efforts were directed toward community members, kebele leaders, private and government health workers, and religious leaders throughout the districts. Water source suspected for

contamination was closed in the woreda to prevent further transmission or spread. Treating water sources were performed. And continues monitoring and evaluation were recommended.

2.1.6.1.7 Laboratory result

From two patients samples were collected and both tested positive for vibrio cholerae,serogroup 01,serotype Ogawa. From the total of 14 samples water were taken from water sources and tested in Haramaya woredas 14(100%) of the tests were +ve for fecal coliform and 12 (86%) had high to very high risk level of causing disease.

2.1.6.1.8 Chemical Test

12 Free residual chlorine test had been done and only 2 (14%) had detectable free chlorine concentration, while the remaining 12(86%) had no free residual chlorine.

2.1.6.1.9 Physical Test

A total of 16 from haramaya woreda turbidity test had been conducted of which 6 (22%) is > 20 Nephelometric Turbidity(NTU).

2.1.7 DISCUSSION

2.1.7.1 Water source Exposures

Cholera is nowaday a serious public health concern for the most vulnerable groups, who often live in resource-constrained environments with poor availability of clean, potable water and good sanitation practices(2). This outbreak investigation suggested that cholera is waterborne transmission as drinking of contaminated spring water, were associated statistically risk factors with the outbreak. Hand wash after toilet, latrine usage, using of different methods to cleaning water and chlorine were found to be a protective factor against cholera and demonstrating the role of hygiene in cholera control.

In the bivariate analysis, our study found that consuming river and unprotected natural spring water drinks increased the risk of cholera. The multivariate analysis, however, suggested that drinking unprotected natural spring water the increased dramatically the risk of getting cholera infection and a statistically significant risk factor,and this findings similar with cholera investigation done in oromia region(3).Majorities of both cases and controls hadn't access to improved water sources, unprotected natural spring water source which serviced for large proportions of public and it is not suitable for treatment at source site. And tangibly seen was there was very low improved water source within Haramaya woreda.The woreda has experienced significant population growth, overcrowding, competing priorities and limited resources have resulted in poor hygiene and sanitation conditions. These conditions combined with low improved water sources, open defecation and low chlorination rates create an environment highly vulnerable to cholera transmission. In this environment, point

of use drinking water treatment represents the most effective short term strategy to ensure safe drinking water. Investigation results indicated that 20% of case and 78% of controls households had water treatment products. Of these only 18%, 47% of cases and control households had detectable chlorine residuals in stored drinking water respectively during observation. This finding suggests that either social practice is low and shortage or lack of chlorine could make this. Even though the purpose of our study was not to ascertain whether the participants had the required supplies or knowledge to prepare food and drinks hygienically, this is a topic that needs additional investigation.

2.1.7.2 Food exposures

Although fresh vegetables typically include naturally occurring, non-pathogenic epiphytic bacteria, they can become infected with cause disease or pathogens for both human and animal sources during cultivation, harvesting, transportation, and other handling processes. From the farm to the consumer's mouth, raw vegetables can become infected by V.cholera at any point of the manufacturing series(11). The bacteria can survive 2-5 days on contaminates surfaces. In the investigation, a wide range of food items were tested to see if they were associated with risk of cholera infection. Our findings indicate at eating raw/unheated vegetables was a risk factor for cholera infection. And our finding aligned with research conducted at Addis Ababa(3). Cooking raw vegetables for at least 10 minutes will kill V. cholerae, and ensuring safe handling will prevent cross-contamination, making the food safe to eat.

2.1.7.3 Socio-demographic factors

The case and control groups were comparable with respect to age category. In our analysis females made up 62 % of all reported cases. In addition, 27 percent of the reported cases were aged 5 to 15 years, it was the highest proportion when compared to other age and gender groups respectively.However,in bivariate analysis male about 1.6 times higher chance of getting cholera infection female and 1.1 times higher above ≥ 30 years old than < 30 years old. When we came to the occupation status of cholera cases, students and farmers account for the majority, accounting for 28(56%) and 13(26%) respectively, these also agreed with students were 1.2 times higher like hoods of getting cholera infection than not being student but being farmer, houses wife and child (no work) were protective by bivariate analysing.It could be because of differences in exposure and risk among different genders and occupational categories. Males in their productive years are more likely to spend time away from home and are more likely to be exposed to contaminated food and water. Students are at

a higher risk of contracting with each other at school sites and chance of meets with suspected case of cholera is high. Also we had seen with level of education. Majorities of cases' were uneducated than control, with 28% vs.0%, respectively. While not statistically significant, this finding aligns well with the higher proportion of controls reporting 'student' as their occupation. Level of education may impact understanding of health messages. Finding was similar with findings from studies in Ethiopia's Oromia region(3),Uganda(20), and Niger(21).According to the findings from the aforementioned areas, males , people aged 5-15 and above, were more affected than female.

2.1.7.4 Levels of Knowledge, attitudes and practice factors

We also incorporated to see levels knowledge, attitudes and practices (KAP) into the case-control study. While the results of this findings were only applicable to the study population in Haramaya woreda, this area was the most affected by the epidemic. To assess community knowledge, we went through several steps. First, a 95 % of study population had heard cholera on the 6 topics of cholera messaging. The most common source of information was the health workers, with family members & friends and community members. These findings suggest that people were gathering different information and talking with each other about the messages of social mobilization campaign. Sanitation and hygiene, hand washing, the importance of drinking treated water, and immediately seeking health care when diarrhea develops also appeared to be well retained messages. Moreover, when we cross-checked with by bivariate analyzed, hand washing and knowledge on ways of cholera prevention, were protective factors 0.331[0.029-3.840] and 0.211[0.054-0.835] respectively. This may suggested result of health education. Given that health messaging had only been disseminated for a few weeks before our study, these findings indicate that knowledge and preventive messages were reaching the community.

Study participants didn't understand the importance of soap in preventing cholera and we found that soap wasn't universally available. Also the major gaps existed between the knowledge of ORS and water treatment products and the possession of these items. WASH interventions focused on improving the practice of point-of-use water treatment and ORS use might help to increase the availability of these prevention and treatment products.

2.1.8 Limitations

This study was limited with late notification of the outbreak which could be attributed to poor coordination of different stakeholders made delayed initiation of response. Nevertheless,

response started at almost by the 1st of the September 2016 though not timely but mitigated the outbreak.

Inconsistent or incomplete data from health facilities can hinder accurate analysis. And geographic or logistical challenges may restrict access to outbreak sites, delaying response efforts. Additionaly,many cases of cholera may go unreported, especially in remote or underserved regions. Moreover, the dynamic nature of cholera transmission can complicate identifying the source and effectively controlling the outbreak.

Lastly, we could not entirely rule out the possibility of misclassification of cases as controls since most cholera cases are asymptomatic. However, we tried to minimize this selection bias by recruiting our controls from every two households to the right of the household of the cases where no member had no signs and symptoms of diarrheal disease within the study period. Only recent cases were recruited for the study. Furthermore, confounders such as socioeconomic status and differences in age groups in the unmatched case control study could have influenced the association found.

Despite these limitations, the study provided useful information to stakeholders on actions that will avert future outbreaks by provision of basic water, sanitation and hygiene infrastructures such as functional boreholes and standard pit latrines. Community risk communication and surveillance strategies need significant improvements to ensure prevention of adverse effects of diarrheal diseases in general and cholera in specific.

2.1.9 Conclusion & Recommendation

Vibrio cholerae was the cause of the outbreak in Haramaya. Drinking water from unprotected natural spring and wells water, didn't use chlorine, and consumption of raw vegetables were significantly associated with the cholera outbreak.

-Water Safety Improvements(For NGOs and Aid organizations)

Protect Water Sources:Implement measures to protect natural springs and ensure they are not contaminated. This may include fencing off the area and regular monitoring for contamination.

Water Treatment:Provide access to safe drinking water through chlorination or boiling. Establish community water treatment facilities if necessary.

Public Health Education(for Zonal health Bureau and local community members)

Hygiene Education Campaigns:Launch community education programs to raise awareness about the risks of consuming untreated water and raw vegetables. Focus on proper cooking and washing methods.

Safe Food Preparation:Educate the community on the importance of washing vegetables thoroughly and cooking food properly to kill potential pathogens.

-Sanitation Improvements

Sanitation Facilities:Improve sanitation infrastructure, including the construction of latrines and waste disposal systems, to reduce environmental contamination.

Community Hygiene Promotion:Encourage community practices such as handwashing with soap, especially before eating and after using the toilet.

By addressing these recommendations, the risk of future cholera outbreaks in Haramaya woreda can be significantly reduced.

What is all about this topic?

Cholera is an infectious disease that is endemic in most parts of Ethiopia,including Haramaya.Prompt detection and confirmation of cholera outbreaks facilitate rapid responses and lessen their effects on the population and risk factors for cholera include drinking of contaminated and untreated spring water and didn't use chlorine, lack of knowledge on ways of prevention and consumption of raw vegetables.

What this investigation adds

We found that community of Haramaya woreda drank of contaminated and untreated natural spring water and consumption of raw vegetables, lack of knowledge on ways of prevention independent risk factors for cholera outbreak in Haramaya Woreda.

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CHAPTER THREE:HEALTH PROFILE DESCRIPTION

3.1 Health Profile Description of Negelle Arsi District,West Arsi Zone of Oromia Region

Abstract

Background-A health profile is essential for identifying and prioritizing health issues to guide planning, implementation, and evaluation of interventions. This study aimed to assess the community's health status and identify potential health problems in the district for priority setting.

Methods-An institutional-based cross-sectional descriptive study involving record reviews and structured interviews was conducted in the woreda from January 25 to February 09, 2023. Data were gathered through interviews with sector officers and document reviews in each unit and DHS2. Microsoft Excel was used for data analysis**.**

Result-The total population was 234,974, living in 31 rural and 5 urban Kebeles, with an estimated 8,154 pregnant women. Health service coverage was 100%, and all health centers had access to transportation and electricity. However, only 20% of health centers and 10% of health posts had water facilities. Coverage of ANC 3162 (66%) of 4756 and antenatal care fourth service coverage was 1994(42%) and PMTCT service coverage was 1(2%). In the woreda skilled delivery service coverage was 1897 (40%) and post natal service care coverage was 5712 (120%), long acting family planning 12768 (59%), short acting family planning 13938(109%) of 25536 and syphilis test 2517(80%) out of 3162. In adult outpatient cases, acute febrile illness (19%) and typhoid fever (17%) were the leading causes of morbidity. In children under 5, diarrheal diseases and pneumonia were the primary causes of morbidity.

Conclusion- Main source of income for majority population was agriculture and more than half of population practicing Muslim(65%) religion. Source of safe water was very low in the district as relative to the report of EDHS 2016 which was 22.4%.In 2020,the district's performance on primary health care components,particularly the eight elements of maternal and child health, exceeded 90%, indicating effective monitoring and strong emphasuis on maternal and child health. Almost all top ten and top five morbidity of Negelle Arsis district was communicable disease like typhoid, typhus, intestinal parasite, non-bloody diarrhoea.

Key words- Health profile, District Health Assessment, Negelle woreda, West Arsi,2023

3.1.1 Introduction

A health profile is a comprehensive compilation of information about a community. The information in a profile reflects the health of a particular community from many different perspectives. A community can refer to a county, a locality within a county, a tribe, or a multi-county region. The information may include data already collected and documented about a community or information collected by the organizations or individuals creating the profile. It involves collecting and interpreting information from various sources to gain a thorough understanding of community health. Health profile assessment systematically gathers, organizes, and documents health and socio-demographic data from a specific area(1). This comprehensive data is crucial for public health officials and stakeholders in policy development ,planning, and evaluating public health programs.

Primary uses of a comprehensive community health profile are to compile community data and interpretation of that data in one place, so that local health data can be reviewed and used by many sectors of the community, clearly present a community's health needs and issues so that they can be prioritized for action, identify health indicators and sources of data that can be used to monitor, change and progress in addressing priority health issues and form the basis for the community health improvement plan and other community planning documents(2). Reliable and timely health information is essential for policy development, proper health management, evidence-based decision-making, rational resource allocation and monitoring and evaluation of the public health situation. While the demand for health information is increasing in terms of quantity, quality and levels of disaggregation, the response to these needs has been hampered because of fragmentation and major gaps and weaknesses in national health information systems. World Health Organization (WHO) collaboration with its Member States will strengthen the national health information systems, and enable the generation of timely and reliable evidence to assess the health situation and trends, and the health system response. Most important, it will provide the information needed by health policy and decision-makers(3). This Health Profiles description document in west Arsi zone, Negelle Arsi district needed to reflect health for a diverse population throughout all stages of life, and so there was a limit to the number of indicators that can be provided for any one issue. Where possible, an indicator was selected that would draw attention to potential problems, so that these can be assessed.

3.1.2 Rational of the study

This health profile aim to facilitate discussions that help local adminstrations and health services prioritize and plan initiatives to enhance community health and reduce health inequalities. This specific health profile focuses on priority setting and understanding the social,economic, and geographical aspects of health problems in Negelle Arsi district, along with performance activities from July/ 2022 to June/2023.

3.1.3 Objective

3.1.3.1 General Objective

To assess holistic or comprehensive health and health related indicators of Negelle Arsi district, Oromia,Ethiopia, 2023.

3.1.3.2 Specific Objective

To pinpoint socio-demographic status of Negelle Arsi district, 2023

To identify health and health related determinates of the of Negelle Arsi district 2023.

To describe public health importance disease burden in of Negelle Arsi district Oromia,Ethiopia,2023.

3.1.4 Methodology

3.1.4.1 Study area

This study was done in Negelle Arsi distric which is found in Oromia region, west Arsi zone and it's 225 Km away from Addis Ababa capital city and 25Km from Shashemene ,zone capital city.

3.1.4.2 Study period

Data collected conducted in Negelle Arsi district from Jan25- Febr 09/2023.

3.1.4.3 Study design

Institutional based cross-sectional survey was performed by using structured questionaries with with mixed quantitative and qualitative, interview and group discussion of respective sectors. Finally data was analysed by using Microsoft excel and ArcGIS software.

3.1.4.4 Sampling techniques

The study area was chosen through discussions with the ORHB and Zonal health Office,focusing on district that had not recently conducted a health profile or by purposive sampling technique.

3.1.4.5 Study population and Data source

All age groups of Negelle Arsi district population without any exclusive criteria.The report of health profile collected from:- health bureau,adminstration Office,water bureau,education burea,

finance & economic development Bureau, agriculture and rural development office,health Facilities, animal health office and review of related literatures conducted in the region,culture and tourism bureau.

3.1.4.6 Data management

Data were entered, cleaned and analysed by using MS-excell 2010. The results were presented using tables,figures and charts.

3.1.4.7 Ethical clearance

The data was collected after obtaining official letter from Addis Ababa University and permission letter from west Arsi zone health department as well as from Negelle Arsi district and other respected bodies.

3.1.4.8 Dissemination of results

The results of the finding were submitted to addis Ababa University School of Public Heath departement of Field Epidemiology, respective disrtict and Zonal Health Bureau by hard copy and electronic soft copy.

3.1.4.9 Operational definition

Demography: - is the scientific study of human populations primarily with respect to their size, their structure and their development; it takes into account the quantitative aspects of their general characteristics.

Crude birth rate: It is the number of live births in a specific geographic area (such as a nation, state, or county) for 2022/23, divided by the total mid-year population of that area and multiplied by 1,000.

The crude death rate:is calculated by dividing the total number of deaths among residents in a specific geographic area (such as a country, state, or county) by the total population of that area for 2022/23, then multiplying by 100,000..

Neonatal mortality rate: - is calculated by dividing the number of deaths among children under 28 days old during 2022/23 by the number of live births in the same period, then multiplying by 1,000.

Maternal mortality rate: - Number of deaths assigned to pregnancy-related causes in 2022/23 divided by number of live births during the same time interval and multiplied by 100,000.

Maternal mortality rate:is calculated by dividing the number of deaths attributed to pregnancy-related causes during 2022/23 by the number of live births in the same period, then multiplying by 100,000.

Antenatal care: -Any pregnant women who visits health facilities before give birth

Tuberculosis case detection rate: - is the number of new all form tuberculosis cases notified to WoHo in a given year, divided by WoHo estimate of the number of incident tuberculosis cases for the same year, expressed as a percentage in 2022/23.

3.1.5 Result

3.1.5.1 Historical back ground

Negelle Arsi is a district located in the Great Rift Valley, within the West Arsi Zone of the Oromia region, and is 200 km from Addis Ababa and, 25 km far from Shashemenne,zone town(Figure 13).Formerely the name Negelle Arsi called '**Sibillan**',which was called from trading of **metal(sibilaa).**After that the new big tree '**Egersa Tree'** was planted and grew. Under that tree there was held different peace negotiations and succeded.After that the name'Sibillan' changed to 'Negelle' means '**Nagaa'(Peace**).The district bordered by on the south by Shashemenne zuria and Kofele , on the southwest by Lake Shala which separates it from Shala, on the west by Southern Nations,Nationalities and peoples Region,on the north by East Shewa with which it shares the shores of Lakes Abijatta and Langano, and on the east by Heban Arsi ,Qore woreda and small portion by Arsi Zone. (Source:-Negelle Arsi Culture and Tourism Offices)

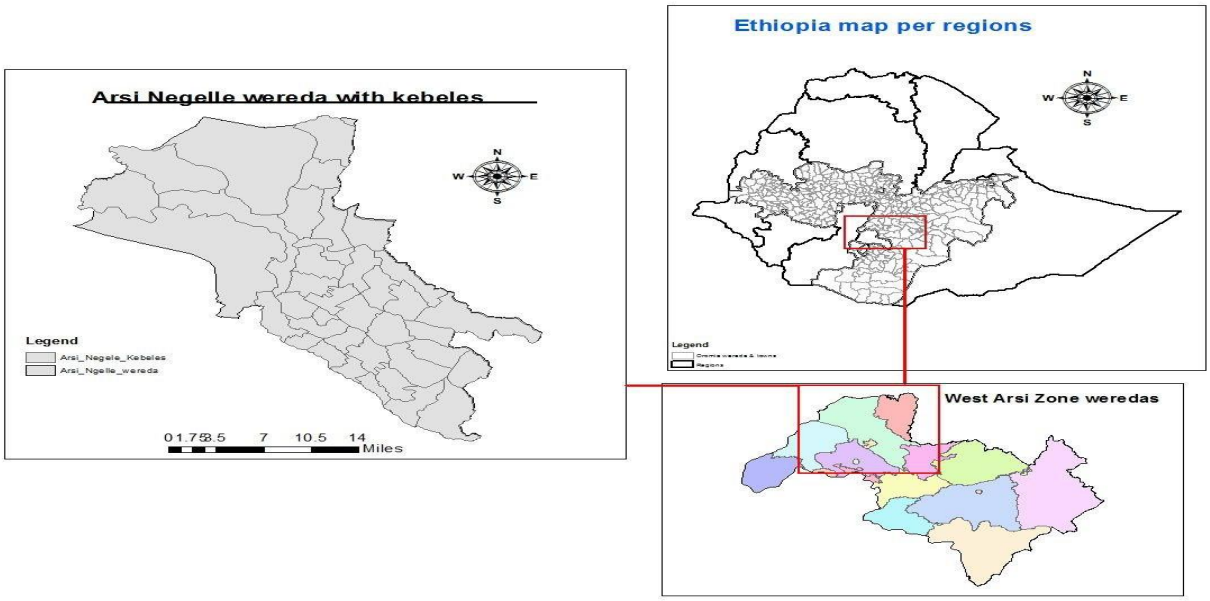

Figure 13:Map of Negelle Arsi

3.1.5.2 Demographic Information

Negelle Arsi woreda has an estimated population of 234,974 in 2023, with 125,105 males (53%) and 111,871 females (47%), resulting in a male-to-female sex ratio of 1:1. Among the total population, there are 7,543 children under one year old (3.2%), 38,609 under five (16.4%), and 111,866 under 15 years old (47.6%). Women of childbearing age number 52,000 (22%), and pregnant women also total 111,871 (47.6%), with an average household size of 4.8. (Table 10).

Table 10: Population of Negelle Arsi district,2023

S.N	Description	Conversion factor	Expected level	remark
1	Total population	100%	234,974	
2	Male	52.39 %	125,105	
3	Female	47.61 %	111,871	
5	6-59 months'age group	15 %	35,246	
6	24-59 months'age group	10.721%	25,192	

7	Surviving infant	3.21 %	7,543	
8	Under three years	9.337 %	21,940	
9	Under five years	16.431 %	38,609	
10	Women with reproductive age groups 15-49 years	22.130 %	52,000	
11	< 15 years group	47.608 %	111,866	
12	15-24 age group	19.759%	46,429	
13	15-59 age group	47.530%	111,683	
14	House Hold	4.8 %	11,279	

The population profile indicates that relative a very wide base reflects high fertility rate and crude death rate is declining,which has a broad base and narrow top is called seems Expansive**.**And lower than or short average life expectancies. Approximated total dependency ratio of the woreda was 90,039 (38%),which the old and young age was 3% and 35% dependency ratio .The district has a total of 11,423 households,with an average of 4.8 people per household. Women of reproductive age number 49,885, making up 21% of the population)(Figure 14).

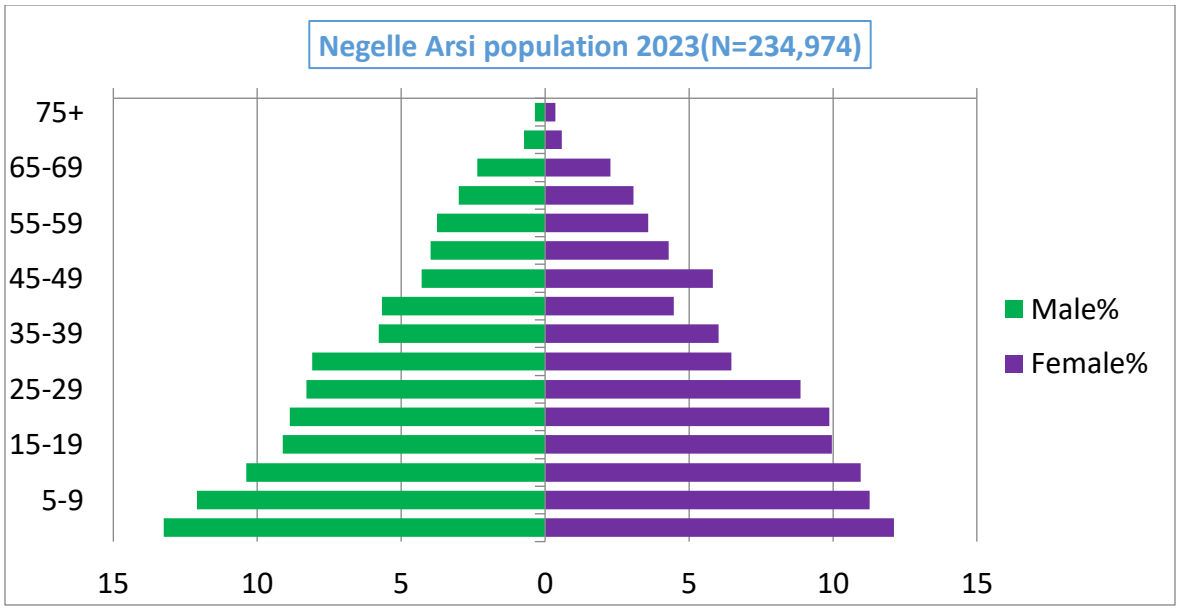

Figure 14: Population Pyramid by sex & Age Category of Negelle Arsi,2023

According to information of woreda taken house to house count performed in 2022 by woreda Adminstration which is done every a year during routine activities ,the total number of population was list by cluster as below(Table 11).

Table 11:Populations at Cluster level of Negelle Arsi district in 2023

Cluster	Male	Female	Total	Remark(#included kebeles)
Gambelto	16849	16,188	33037	4
Dole	17223	16,548	33771	8
Gorbi	14,715	14136	28851	4
Qalo	23,750	22,818	46568	7
Gode	12,423	11,936	24359	3
Basaqu	16,743	16,087	32830	5
Qarsa	8,398	8,069	16467	2

Shalla Bila	9,736	9,355	19091	3
Woreda			**234,474**	**36**

3.1.5.3 Religion and Ethnic

Religious and ethnic compositions are key components of a nation's demographic characteristics. In Negelle Arsi district the majority of the population is Oromo(95%) , Amhara(3%), others ethnics groups(2%). Most inhabitants are muslim(65%), 25% practices Ethiopia Orthodox Church , 5% were protestant and 5% others(Figure 15).

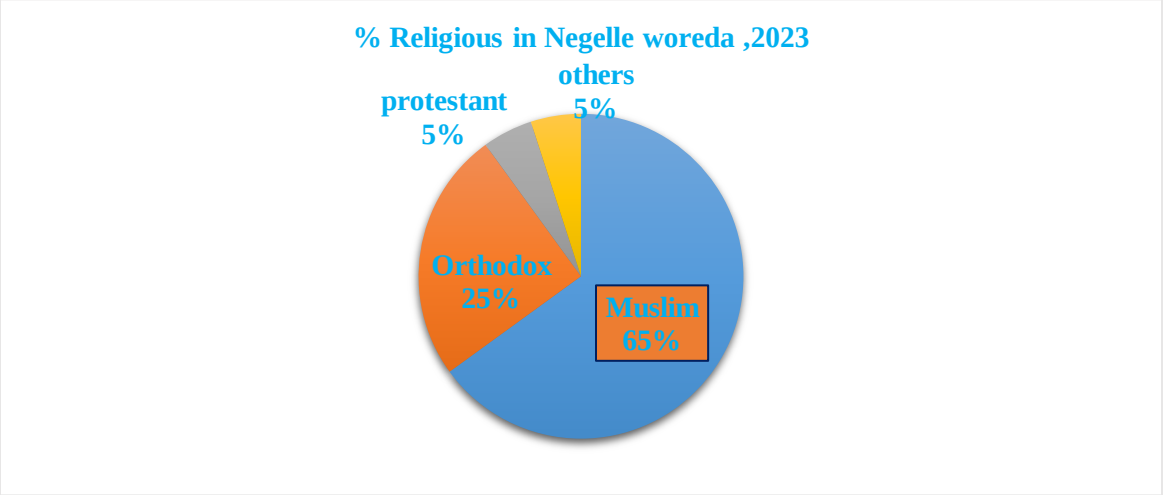

Figure 15:Religious Composition of Negelle Arsi District,2023(Source:-Woreda Tourism office)

3.1.5.4 Administrative and Political structure

Negelle Arsi district has administrative structure at woreda level like administrative office, Social office and Economy office.The district has 31 rural kebele and 5 urban kebele. All the sectors offices in the woreda are responsible for the this district. GSI,WMO and TSD are the three main non-governmental organization(NGO) supporting this woreda.

3.1.5.5 Source of economy

The majority of population approximately (90%) depend on agriculture in district.And (29.9%) is arable land,4.3% pasture,5.2% forest,and the remaining 60.6% is considered

swampy,degraded or otherwise unusable.The three major lakes of this woreda-Abijatta,Langano and Shala-cover about 32% of its area.Onion is an important cash crop.

Industry in the woreda includes 19 small industries employing 79 people as well as 570 registered businessmen including 148 wholesalers 243 retailers and 179 service providers.Construction-grade sand and soda ash mined in Negelle Arsi.There were 33 farmers association with 21,777 members and 12 farmers service comperatives with 11,430 members.From livestock cattle are 30,7789,Goats are 35,898, sheep are 34,592,donkeys are 26,701,camels are 44, others are 103,818 (hens,dogs and cats).

3.1.5.6 Education and school health

Negelle Arsi woreda has a total of 93 schools (primary school 80(86%), secondary school 7(8%) and Kingergartners 6 (6%)),which are 6 private kinger gartner school,78 and 2 primary government and private schools respectively. And a total of 59,991 students were enrolled in these schools, with 31,609 males(53%) and 28,382 females (47%). A total of 932 teachers are there, of this 653(70%) are males.From the total students enrolled 1.3% are dropped out due to unknown reasons. 38% schools have water supply but the remaining schools were no water access. Respective of latrine contraction and utilization, all schools were latrine but except 55 schools are not improved.All the schools have Anti HIV AIDS clubs and all health related information dissemination is held every a week(Table 12).(Source:-Data reported by HEW ,2023).

Table 12:Number of educational institutions in Negelle Arsi district in 2023

S.n	Institution name	Number	Number of teachers	Male	Female
1	K.G	6	56	36	20
2	Primary	80	752	534	218
3	Secondary	7	119	109	10
4	Collage	0	0	0	0
	Total	**93**	**927**	**679**	**248**

Table 13:Education enrolment and school health activity of Negelle Arsi district , 2023

S.N	Educational enrolment plan	Educational enrolment achievement	percentage
Male	30,561	31,609	103
Female	29,714	28,382	96
Total			**99.5**

3.1.5.7 Water,Electric Power,Transport,Communication and Utilities

According to data obtained from the district water supply for 234,974, among this 115,433 around only 67% got safe water. All kebeles of woreda access to all weather road and transportation . All private and 12 governmental health facilities have access to electricity and water 24 hours a day. Most kebeles have access to wireless telephone communication, although it can occasionally be non-functional. Recently, mobile services have been introduced. Additionally, computers, postal services, internet access, fax, and banking services are almost universally available.

1.1.5.8 Disaster Status

The biological disaster,malaria epidemics, every raining season especially this year september 2022 to november 2022. During this period, a total of 2,029 cases were recorded, with 1,060 males (52%) and 969 females (48%). Males were more affected than females.There was 1 death.The rest all were treated and cured,insecticides larvae source management was done,which was 3832 sites was sprayed. Also 63,793 bednets were distributed(Figure 16).

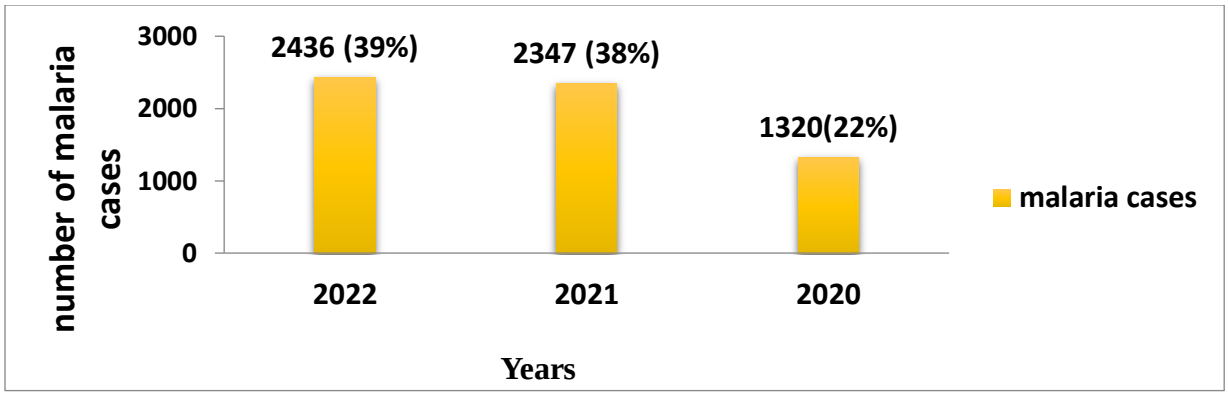

Figure 16:Malaria outbreak in Negelle Arsi district,2020- 2022.

3.1.5.9 Health delivery system

The structure of Negelle Arsi district health bureau includes 7 HC and 32 HPs. Each health centre has satellites health posts and which makes health service access 100% in the district(Figure 17).

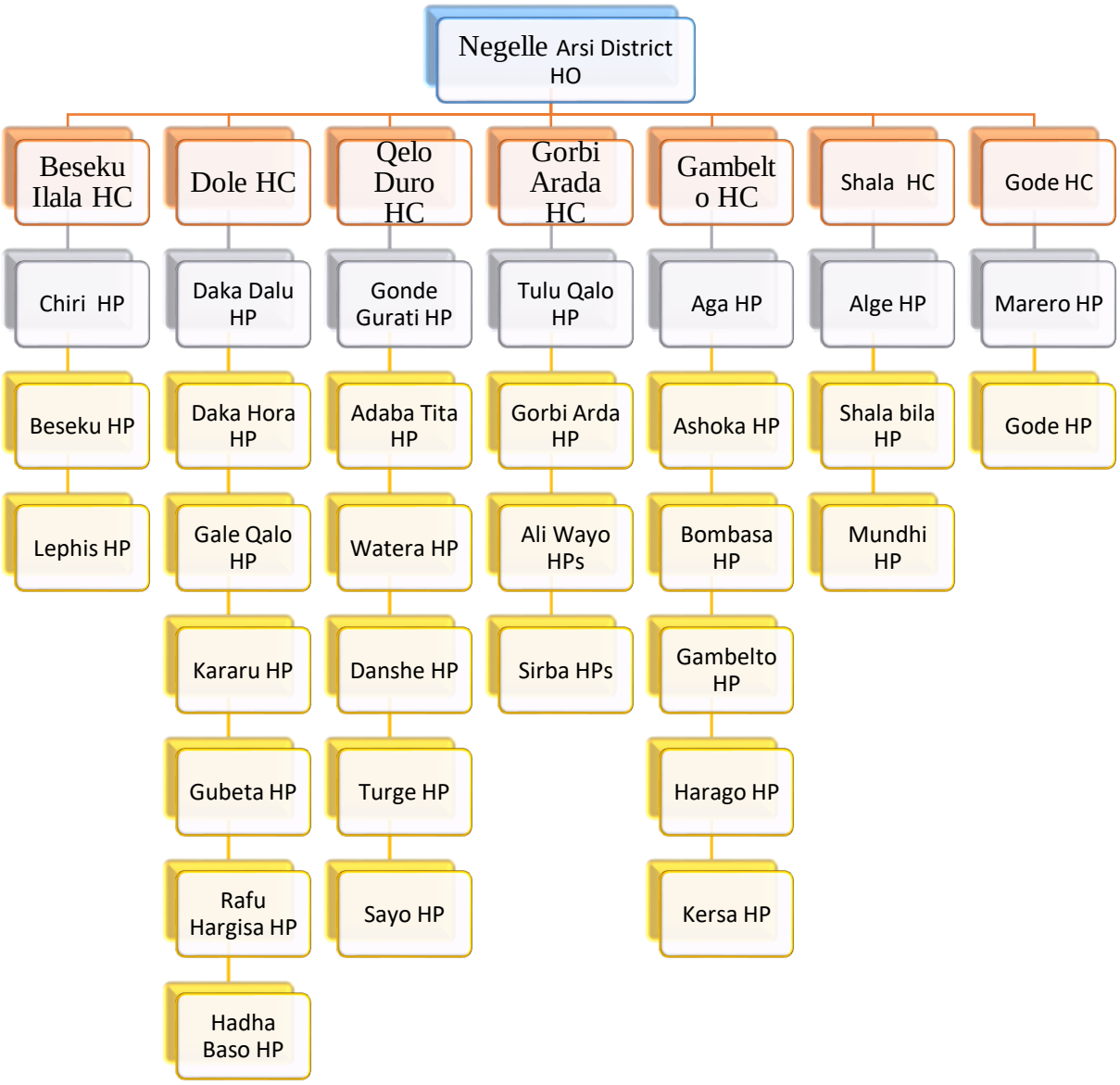

Figure 17:Organograph of Health strucure of Negelle Arsi Health Office

Each of the 7 health centers has two main core processes: health promotion and disease prevention, along with curative services. Under each core process, these are various case teams, including the OPD case team, admission case team, laboratory case team, pharmacy case team, triage case team, disease prevention and control case team, family palanning case team, and IMNCI case team (Figure 18).

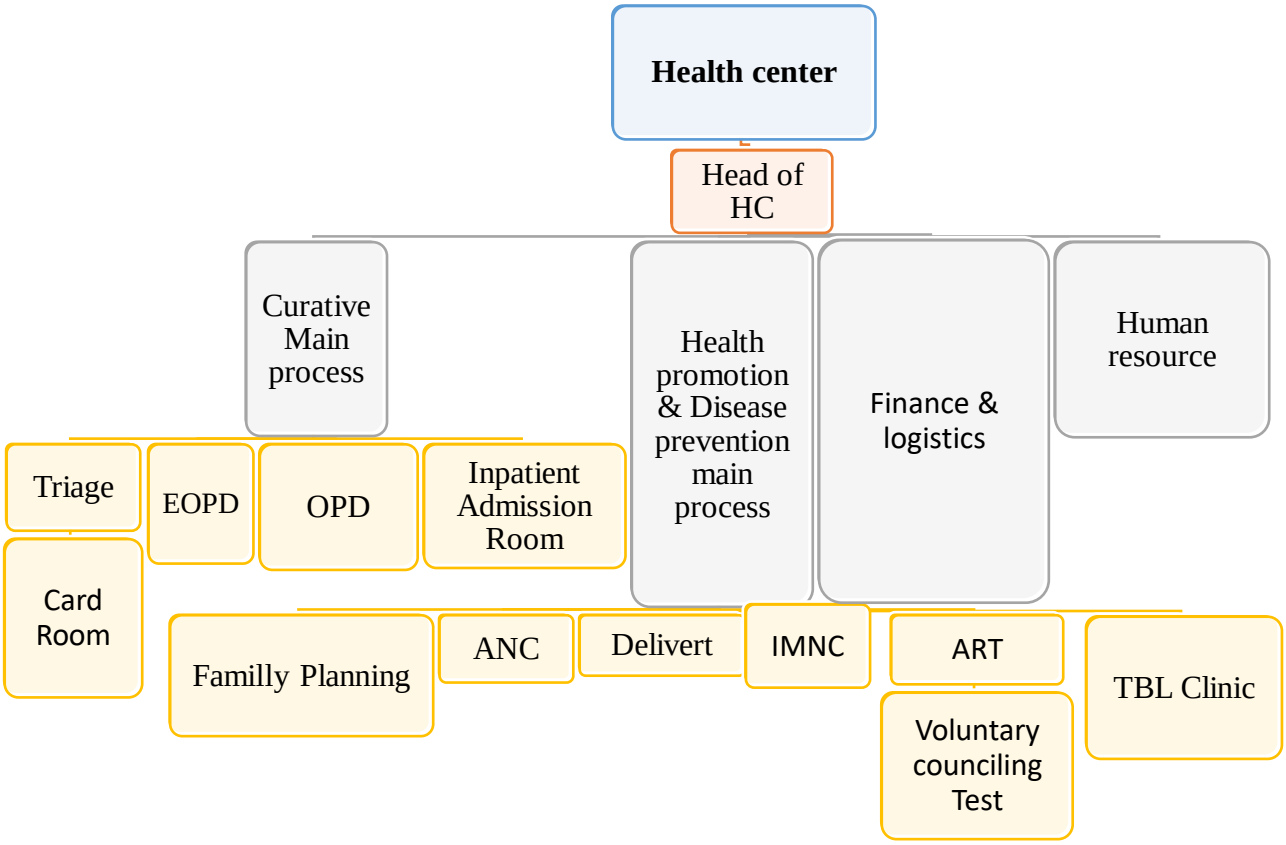

Figure 18:Each Health Center Structure of Negelle Arsi district,2023

Regarding infrastructure of health facility in Negelle Arsi district in 2023 all of health centres was all seasonal road access ,power supply by electricity and solar system ,have save water supply. From 31 health posts,5 health posts have access to electricity power supply.

3.1.5.10 Available health facility and human resource in the woreda

In the district 3(three) type B,2(two) type A,2(two) type C health centres and 31 health posts which were governmental. Again in the woreda all type of 9 all types private clinics. Regarding human resource availabilty for health sectors 23(8%) public health or health officer, 6(2%)Bsc nurse Bsc, 49(18%) clinical diploma nurse ,16 (6%) midwives,12(5%) pharmacy technician,17 (6%) laboratory technician,68(25%) health extension workers,1 enviromental health proffesion,7(3%) HMIS and 79(29%) supportive(adminstrative) staff.

Table 14:Availability of health facility and human resource in Negelle Arsi district , 2023(source:- woreda health office)

Type	Number	# total bed

Governmental hospital		0	0
Governmental health centre	Type A	2	10
	Type B	3	8
	Type C	2	6
Private health facilities	Clinic all type	9	18
	Diagnostic laboratory	0	0
	Drug store	0	0
	Pharmacy	2	0
Governmental health post		20	20
Nongovernmental	Health centre(HC)	0	0
	Health post	0	0
	Hospitals	0	0
	Clinics	0	0

Number of human resource in the district

Type of profession	Male	Female	Total	Ratio
Public health	21	2	23	
Nurse(Bsc and diploma)	38	17	55	
Midwifery(Bsc and diploma)	7	9	16	
Laboratory (Bsc and diploma)	10	7	17	
Pharmacy(Bsc and diploma)	9	3	12	
Environmental Bsc and Diploma)	1	0	1	

HIT and HMIS	4	3	7	
Health extension workers	0	68	68	
Supportive staffs	36	43	79	
Total				

3.1.5.11 Health budget allocation of the district

Total budget allocated from zone to Negelle Arsi woreda had 350,000,000(Three hundred fifty thousands) and then the district cabinet members was allocated including salary 5,950,000(1.7%) for woreda health office. According to health care financing guideline of Ethiopia the budget allocation was fair to support activity of health office. There were three NGO suports health program like women developmental Army,on adolescent, family planing,sexual reproductive health.

3.1.5.12 Top ten and top five leading cause of morbidly of Negelle Arsi district in 2023

In the district majority of top ten and top five diseases were communicable which was possible to prevent the transmission from infected to health on by keeping good personal hygiene. In the area the most leading cause of morbidities top ten were acure fibrile illness(AFI) out of and least cause was eye infection(Table 15) .

Table 15:Top ten diseases in Negelle Arsi district , 2023(source:- woreda health office)

S.N	Name of disease	Number disease	%
1	AFI	3148	22
2	Malaria	2936	21
3	Trauma	2184	15
4	Pneumonia	2420	17
5	Skin infection	1016	7
6	Dyspepsia	624	4.4

7	I/P	604	4.2
8	Non-bloody diarrhea	544	3.8
9	Urinary tract illness(UTI)	540	3.6
10	Eye infection	228	2
Total		**7496**	**100**

3.1.5.13 Performance status of health key indicators

3.1.5.13.1 Maternal health service coverage

In 2023,7 month performance antenatal care first service coverage in Negelle Arsi district was 3162 (66%) of antenatal care fourth service coverage was 1994(42%) and prevention of mother to child transmision (PMTCT) service coverage was 2755(88%). In the woreda skilled delivery service coverage was 1897 (40%) and post natal service care coverage was 5712 (120%).Out of total family planning coverage 21527, long acting family planning7589 (59%), short acting family planning 13938(55%).syphilis test 2517(80%) and hepatitis test done 2358(75%) (. Table 16).

Table 16:Maternal health service coverage in Negelle Arsi district, 2023

Activity	Plan	Achievement	Performance %
Antenatal care(ANC1)	4756	3162	66
ANC4	4756	1994	42
PMTCT	4756	2755	88
Skilled delivery	4756	1897	40
Postnatal care(PNC)	4756	5712	120
Syphilis	4756	2517	80
Long acting	4756	7589	59

Short acting	4756	13938	55

1.1.5.13.2 Child health service coverage

Immunization and nutritional status data obtained from the district show that Bacillur culmatte guerrin(BCG) 4201(103%) above planning(4077), pentavalent vaccination fist and third 4301(above 100% and 4306(above 100%) out of total planning of 3783 respectively. On the other hand pnemoccocal vaccine(PCV)1 and PCV3 4302 (above100%) and 4227 (above 100%) out of planning(3783) respectively and as well as Measles first and third 3657(96%) and 3130(83%) respectively. Also nutritional assessment data shows, growth monitoring was closely monitored and nutritional screening was 30327(80%) out of 35246 and as well as pregnant and lactating mothers screening was 8074(99%) out of 8154(Table 17).

Table 17:Immunization and nutitional coverage in Negelle Arsi district,2023

Activity	Plan	Achievement	per cent
BCG	4077	4201	>100
Penta1	3783	4301	>100
Penta3	3783	4306	>100
PCV1	3783	4302	>100
PCV3	3783	4227	>100
Rota1	3783	4250	>100
Rota2	3783	4117	>100
Measle 1	3783	3657	96
Measle 2	3783	3130	83
Fully vaccinated	3783	3731	99
G/ monitoring	13417	10757	80
Nutritional screening	35247	30327	86

PLM	8154	8074	99
MAM	1081	714	66
SAM	1008	38	4

3.1.5.14 Endemic disease

Endemic disease in the district was commonly communicable disease like tuberculosis, malaria, pneumonia, non-bloody diarrheal disease and typhoid fever.

3.1.5.14.1 Tuberculosis

In 2023 all tuberculosis(TB) cases notified from health centres to the WoHo were 100 which was all form of TB and that makes TB detection rate 23% with all screened for HIV. Among those 30 were pulmonary positive and 30 were extra pulmonary as well as the treatment completion rate and TB cure rate 90% and 95% respectively.

3.1.5.14.2 Malaria

As data obtained from the district shows that malaria distribution was 821, 1,320, 2,347 2,436 and 2936 in 2019,2020, 2021,2022 and 2023 respectively. In the district malaria trend was slightly increasing for the past fives consecutive years(Figure 19).

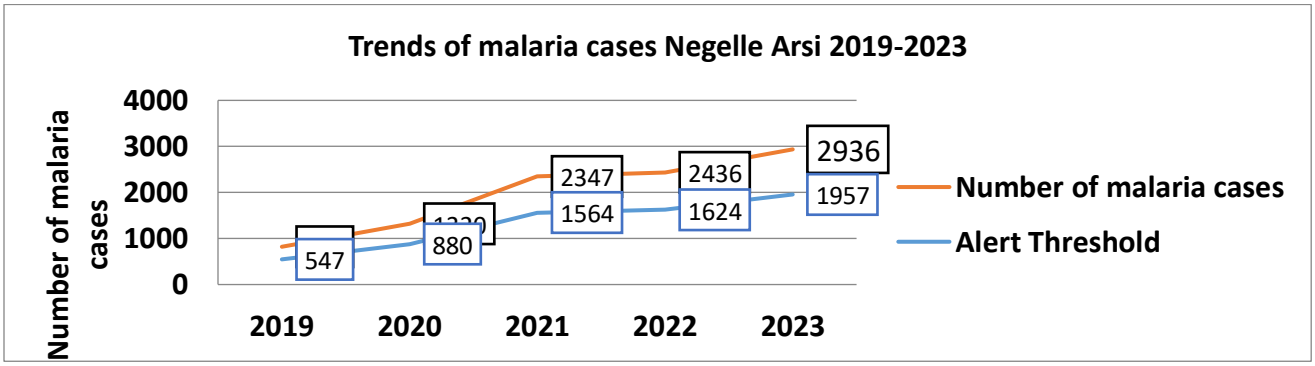

Figure 19:Malaria Trends of Negelle Arsi district,for lasts five years(2019-2023)

3.1.6 Discussion

Majority of population (90%) main source of income was agriculture and 65% of population were practicing muslim religion. On the other hand, the health activities performance in the district was satisfactor,exceeeding 90% . This improvement may be attributed to the expansion of health services to community levels through the Health Extension Program(HEP), along with enhanced clinical diagnosis and the efforts of health workers.

Water is basic human need, with each person requiring at least 20 to 50 liters of clean, safe water daily for drinking, cooking and personal hygiene. Assessing water quality helps document its natural characteristics and determine pollution levels. Nowadays, monitoring encompasses a broader perspective, addressing health and socio-economic issues. Ensuring access to safe drinking water and adequate sanitation, along with promoting personal, domestic, and community hygiene, can significantly enhance the quality of life for millions(4). And in district safe water coverage was 67% and which was above than Ethiopian digital health service(EDHS) 2016 of improved drinking water is 57% in rural area. But very below in urban, which is EDHS 2016 of improved drinking water is,97%(5). Still source of safe water coverage was good in rural area as study conducted by Access to Improved Water Source and Satisfaction with Services Evidence from urban Ethiopia which was 29%(6).

Maternal and child health is an important public health issue because, we have the opportunity to end preventable deaths among all women, children and adolescents and to greatly improve their health and well-being. Far too many women, infants and children worldwide still have little or no access to essential, quality health services and education, clean air and water, and adequate sanitation and nutrition(7). According to data from the district health bureau, maternal and child health service activities averaged over 88%, providing a strong opportunity to reduce maternal and child mortality and morbidity. In the district ANC first and ANC fourth coverage in the 7 months was 66% and 42% respectively which was very good compared with min demographic health survey of Ethiopia in which ANC first and ANC fourth coverage is 74% and 43% respectively(8).

Institutional delivery service or skilled delivery service utilization is one of the key and proven interventions to improve maternal health and wellbeing and to reduce maternal mortality through providing safe delivery and reducing complications that are related to and occurred during birth. In Negelle Arsi district skilled delivery service coverage in the 7 month was 40% which is good compared with min EDHS 2019 which suggests institutional delivery was 48%(8,9).

Childhood immunization save an estimated 2–3 million lives worldwide every year, which has contributed substantially to the reduction in global infant mortality rate from 65 per 1,000 live births in 1990 to 29 in 2018. Vaccines are found to be the most cost-effective approach for reducing childhood disease burden, especially when compared with interventions such as clean water and improved sanitation which can also reduce disease transmission but require expensive

and time-consuming infrastructural investment(10). By having this Ethiopia health minister practicing expanding immunization program (EPI) to address health service and prevent morbidity and mortality. As well as in the Negelle Arsi district the same is true for providing immunization service according to the national guideline and all antigen coverage was BCG 100%, penta1 100%,PCV1 100%, Rota1 100% and meseales1 96% which was higher than reports in min demographic health survey shows BCG 73%, penta1 76%, PCV1 74% Rota1 73% and meseales1 only 59%(8).

3.1.7 Conclusion

It has been found that the main source of income for majority population was agriculture and more than half of population practicing muslim religion. Source of safe water was good in the district as relative to the report of EDHS 2016 which was 67%.In 2023, the district's performance regarding primary health care components, particularly the eight elements of maternal and child health, averagged over 88%. This indicates close monitoring and a strong focus on maternal and child health. Almost all top ten and top five morbidity of Negelle Arsi district was communicable disease like malaria typhoid, typhus, intestinal parasite, non-bloody diarrhoea.

3.1.8 Limitation

There was a lack of data in the district during the data collection process, particularly concerning maternal mortality rate, child mortality rate, crude growth rate, and death rate.Again inconsistency of data was seed like malaria data in the district, disease registration of malaria in the zone and PHEM reports or weekly malaria surveillance report was not the same. Data by itself being secondary or collected by another person was additional limitation for this paper.

3.1.9 Recommendation

- Important of safe water is obvious to washing, cooking and keeping personal hygiene but in the district supply of safe water was very low in urban and it may leads to water born disease and as well as most communicable disease that was preventable by keeping personal hygiene. So to overcome the problem low source of safe water attention should be given.
- To validate and avail all data regarding health and health related events, capacity building or orientation should be given for delegated persons in the district.

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CHAPTER Four: SURVELLIANCE DATA ANALYSIS

4.1 Five Years Retrospective Hypertension Data Analysis Shashamene Town,West Arsi zone,Oromia Ethiopia,in 2023.

ABSTRACT

Background: Hypertension is remains a major public health challenge globally And is monitored through routine surveillance. The aim of this analysis was to describe magnitude of hypertension in terms of place, person and time.

Method: Hypertensive cases defined as a person with systolic BP≥ 140 mmHg and/or diastolic BP ≥ 90mmHg. I reviewed the monthly reporting of DHS2 data during 2018-2022.And quantitative epidemiological literature review was conducted by searching different articles in different databases including **google scholar,PlosONE and PubMed**. And analyzed monthly surveillance data from DHS2 and described proportion of cases.

Results: A total of 10,032 hypertension morbidity case were assessed, averaging 2,006 cases per year. The prevalence rate was 1.39%, with an overall prevalence of 5% and a rising trend, alongside a 0.2% case fatality rate. The highest number of cases were reported from hospitals (71%), while clinics reported the lowest (10%). The greatest number of cases occurred in 2019.

Conclusions and Recommendation: There was increment of hypertension morbidity prevalence in Shashamane town. Timely and appropriate strategies are needed for prevention and control of the disease.

Key words: - Hypertension, Data analysis, Surveillance,Shashamane west Arsi

4.1.1 Introduction

Hypertension, commonly known as high blood pressure, is a chronic medical disorder in which the blood pressure (BP) in the arteries remains high for an extended period of time(1). It is a major public health issue that affects people all around the world. Estimated that nearly 1 billion adults worldwide had hypertension affected by hypertension, and it is estimated that this number will increase to 1.5 billion by 2025(2). The WHO reports that the Africa region has the highest prevalence of hypertension, at 27%(3). In certain African contexts, this rate can reach up to 40% among individuals aged 18 and older, and 46% among those over 25 years(4,5).

As WHO stated by 2022 including hypertension (HTN), Non-communicable diseases accounted for 43% of all deaths in Ethiopia, showing a significant public health issue(9). Specifically, HTN accounting for 62.3% of CVDs, and Although Ethiopia has committed to achieving the Sustainable Development Goal of reducing premature deaths from non-communicable diseases by one-third from 2016 to 20230, the annual death rate from non-communicable diseases, including hypertension, remains high at 39% and now public health problem in Ethiopia(10).

Therefore, aims of this surveillance data analysis to analyze five-year hypertension data to inform prevention and management efforts.

4.1.2 Significance of the data Analysis

Since hypertension is a significant public health issue, ongoing analysis of surveillance data is essential for understanding how to control hypertension, monitoring disease trends, and evaluating the effectiveness of control programs. Therefore, analyzing hypertension data is crucial for identifying trends and distribution, which helps design targeted interventions and strategies for future disease management. So it is interested in conducting a retrospective study analyzing surveillance data on hypertension, as it is a significant public health concern in Shashamane town.

4.1.3 Objectives

4.1.3.1 General objective

- To analyze the five-year trend of hypertension cases in Shashamene Town, West Arsi Zone, from 2018 to 2022.

4.1.3.2 Specific objectives

- ❖ To assess magnitude of hypertension

- To describe epidemiology of hypertension by time, person and place

.

4.1.4 Methodology

4.1.4.1 study Area

Hypertension surveillance data analysis was done in, Shashamane town, West Arsi which is administration found in southern part of Ethiopia. Shashemene, the capital of the West Arsi Zone, is 250 km from Addis Ababa and has 10 kebeles. Government facilities include 2 hospitals and 6 health centers, while private facilities have 2 hospitals, 18 specialty clinics, 23 medium clinics, 20 primary clinics, and 60 pharmacies. By 2007 Census population was 100,454 and the capital city Population was officially estimated at 208,368 in mid-2022. Its administrative center of this zone is Shashamane and known for its Rastafarian community. Geographically, the town is located at 7.0 º, 12’ N latitude and 38.º 45’E longitude with an elevation of 2,695 meters above sea level. The total surface area was estimated to be around 10.72 km2. The town is economically important and expanding quite rapidly compared to other town. About 96% of the city estimated to be wedega and the 4% is dega .The annual rainfall ranges from 1020mm and the temperature ranges from 15-20 degree Celsius throughout the year.

In Shashamane, the largest ethnic groups are Oromo (74.11%), Amhara (9.26%), Welayta (5%), Kambaata (2.3%), and Soddo Gurage (2.13%), with other groups at 7.2%. The dominant Oromo clan is the Arsi Oromo. Most residents practice Ethiopian Orthodox Christianity (43.44%), followed by Islam (31.15%), Protestantism (23.5%), and Catholicism (1.3%)Figure 20).

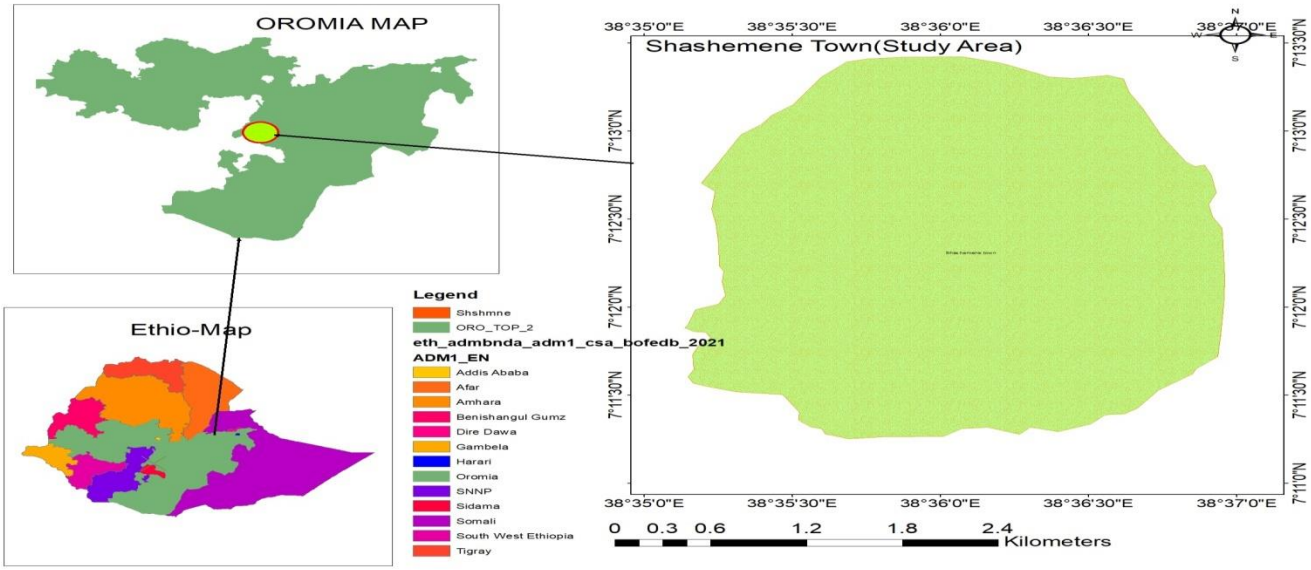

Figure 20: Map of Study area of Shashamane town.

4.1.4.2 Study period

Collected from February 25 to March 5, 2023, covering five years from January 2018 to December 2022.

4.1.4.3 Study design

Retospective review study was conducted

4.1.4.4 Source and Study Population

Any person with adults age 18 years old and above in the Shashemene town, West Arsi zone.

4.1.4.5 Study Unit

Individuals aged 18 and older years old and above diagnosed with hypertension and as cases in legally reporting institutions were included in the study.

4.1.4.6 Sample size & sampling techniques

The study aimed to analyze the last five years(2018-2022) hypertension surveillance data without sampling, using total cases from DHS2 data.

4.1.4.7 Inclusion & Exclusion criteria

All values from the DHS2 reporting period (January 2018 to 2022) in Shashemene were included, while inconsistent values were excluded to reduce bias.

4.1.4.8 Data collection procedure

Official requests a five years (2018-2022) hypertension data were made to the Oromia Regional Health Bureau and triangulated with HMIS data. The data included reports from all health facilities within the PHEM network across the respective woredas.

4.1.4.9 Data quality control

Data quality was maintained and checked for completeness from DHS2 data base.

4.1.4.10 Plan for data processing and analysis

After collecting all data, data cleaning was performed before analysis. Data analysis was conducted using Microsoft Excel 2007, with results presented through frequency distribution, tables, and charts.

4.1.4.11 Ethical considerations

Formal letters were written from Oromia regional health bureau to respective HMIS departments.

4.1.4.12 Dissemination of findings

The results of the hypertension surveillance data analysis were submitted on time to AAU School of Public Health, ORHB, and Shashamane Health Office in both hard and electronic copies.

4.1.5 RESULTS

4.1.5.1 Description of Hypertension morbidity cases in Shashamane town by Time

Within the last five years, of total of 10,032 hypertension morbidity cases reported by DHS2 6,120 (61%) were males and 3912 (39) females.(Figure 21).

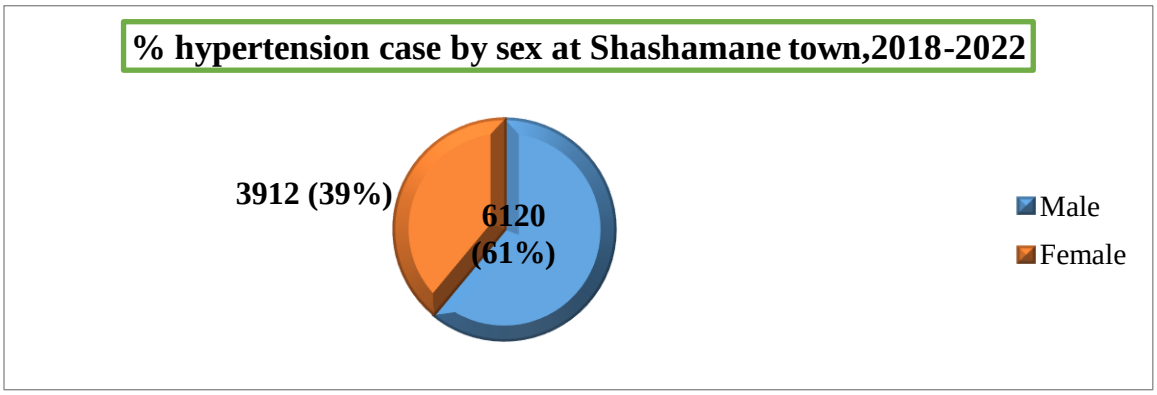

Figure 21:Number of hypertension morbidity by sex Shashamane town, West Arsi from 2018-2022

Considering the variation in each year, poor screening and reporting system. The overall trends of hypertension increased from 2018 to 2019 and decreased from 2019 to 2020 and slightly increased from 2020-2022 in Shashamane town.

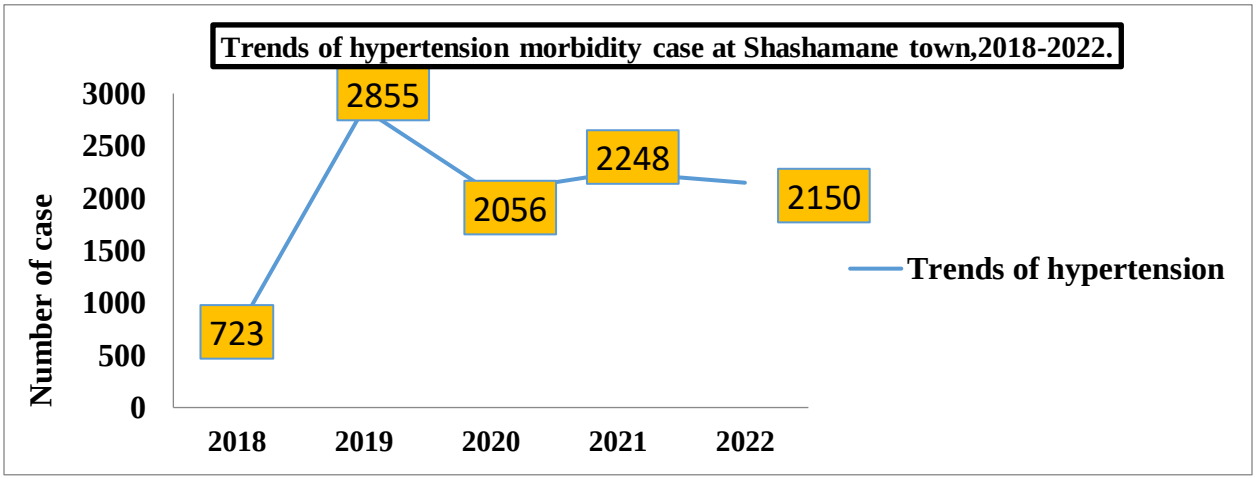

Figure 22:Trends of hypertension morbidity cases reported by year in Shashamane town, west Arsi, and 2018-2022

Table 18:Hypertension cases for five years (2018-2022) that of Shashamane Town

Years	Adults of population above 18 years	#hypertension total cases reported	Prevalence rate (%)
2018	154,605	724	0.47
2019	153,980	2,855	1.85
2020	155,117	2056	1.33
2021	136,372	2,248	1.65
2022	120,853	2,150	1.78
Total		**10,032**	**1.39**

4.1.5.2 Hypertension cases by age and sex

Within the last five years, 2018-2022 hypertension prevalence among men (61%) higher than those of female (39%) (Figure 23).hypertension prevalence increased with age.

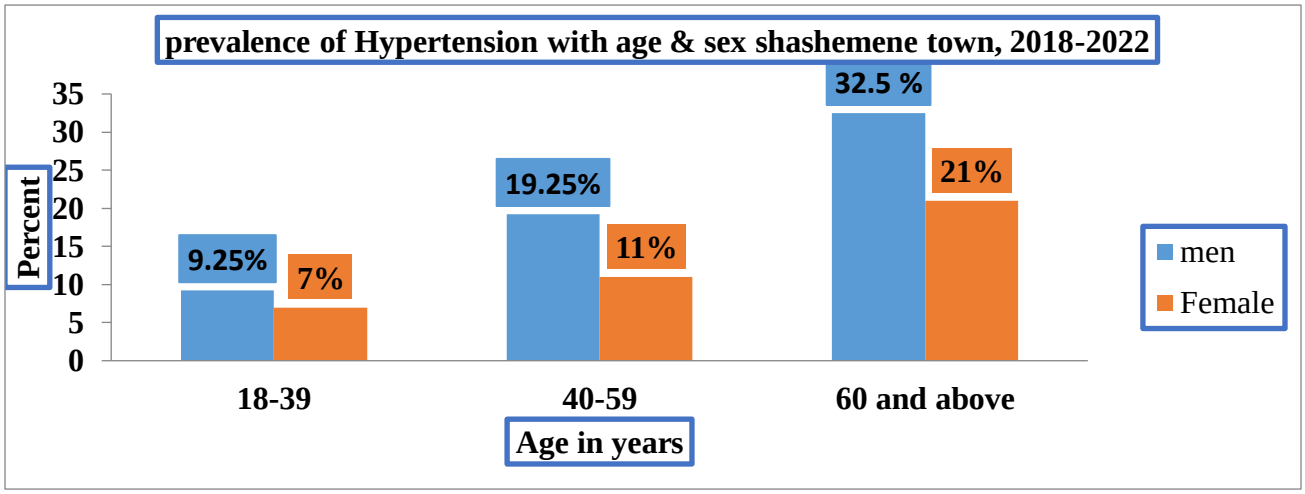

Figure 23: Hypertension prevalence by sex and age among adults 18 and older in Shashemene Town (2018-2022).

4.1.5.3 Prevalence of Hypertension morbidity by Type

From all types of hypertension,primary hypertension accounts for 56% which was the highest of all.And secondary hypertension was 24%. But others were secondary hypertension unspecified,others secondary hypertension and renovascular hypertension which was 14%, 5% and 0.7% respectively (Table 19).

Table 19:Hypertension(HTN) morbidity cases by its types from 2018-2022 Shashamane town,West Arsi

Year	Primary HTN n (%)	2nd HTN n (%)	Reno vascular hypertension n (%)	Other 2nd HTN n (%)	2nd HTN unspecified n (%)	**Total n (%)**
2018	82(2)	0(0)	0(0)	199(41)	442(31)	**723(7)**
2019	1946(35)	584(24)	14(20)	59(12)	252(18)	**2855(28)**
2020	1281(23)	514(21)	22(32)	166(34)	73(6)	**2056(21)**
2021	1198(21)	803(33)	33(48)	47(10)	167(12)	**2248(22)**

2022	1112(20)	520(22)	0(0)	16(3)	502(35)	**2150(21)**
Total	**5619**	**2421**	**69**	**487**	**1436**	**10032**

4.1.5.4 Magnitude of Hypertension morbidity case

From 2018 to 2022, there were 10,032 reported hypertension cases, with Melka Oda Hospital accounting for 47%, followed by Shashamane Specialized Referral Hospital (23.77%) and Bulchana Primary Health Center (23.06%), while other facilities reported fewer cases per 10,000 population. (Figure 24).

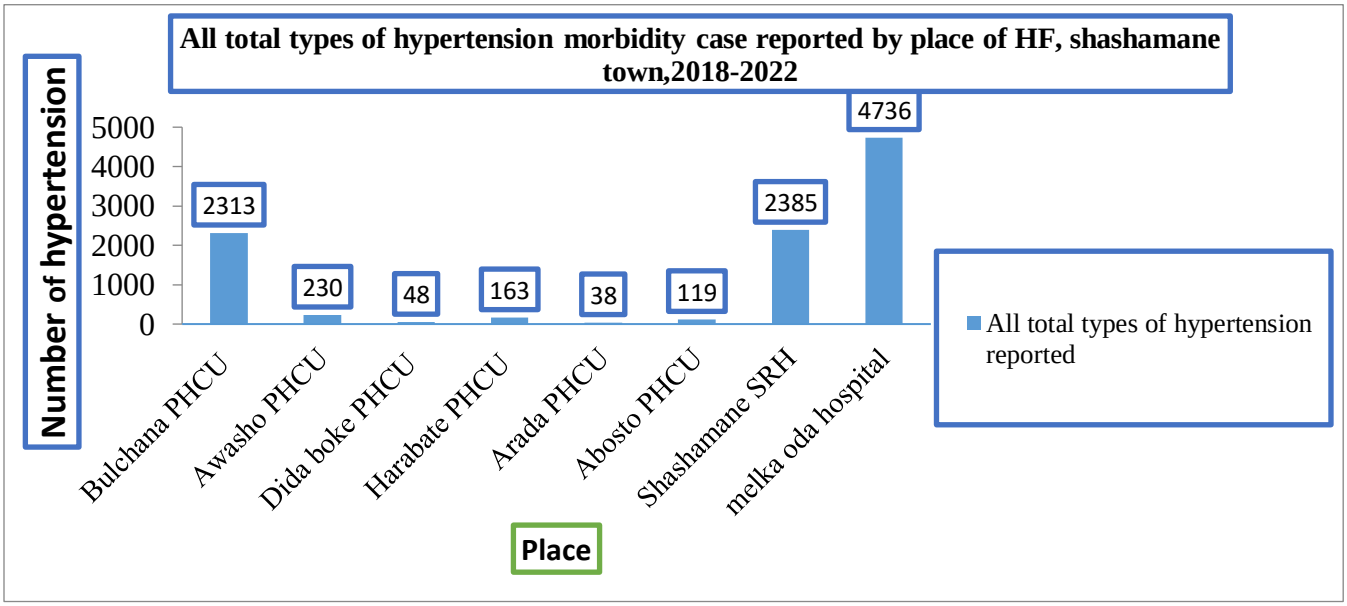

Figure 24:prevalence of hypertension morbidity cases by type at Shashemene Town,West Arsi 2018-2022

The highest prevalence of hypertension cases was reported from hospitals (71%), while health centers and clinics reported lower rates at 19% and 10%, respectively. (Figure 25).

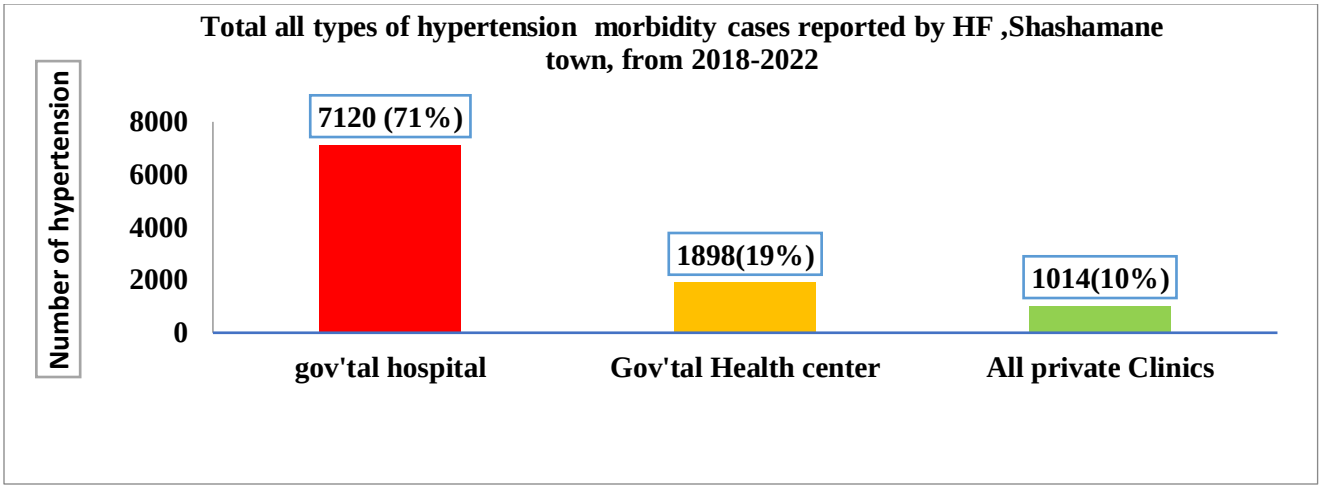

Figure 25:Total of hypertension morbidity cases reported by health facilities Shashemene Town, West Arsi 2018-2022

4.1.6 Discussion

Hypertension poses a public health issue in developing countries like Ethiopia. DHS2 data analysis reveals a rising trend in hypertension cases in Shashemene from 2018 to 2022, highlighting the need for coordinated efforts to address the issue. As Federal Ministry of Health (FMOH) hypertension accounting for 62.3% of CVDs(25) and it affects over 20% of the adult population, with only 1.5% of hypertensive individuals having it controlled and 2.8% receiving appropriate treatment and care(3). Its prevalence is primarily caused by a lack of enhancing monitoring system and evaluations, poor management, treatment and care of hypertension, high fat and sodium intake. This surveillance data analysis shows, the prevalence of hypertension cases were 5% of an estimated total population of 208,368 and the burden of hypertension case in the town is 0.47%, 1.85%, 1.33%, 1.65% and 1.78% from 2018-2022 years respectively. This data analyzed revealed that prevalence of hypertension cases were 5% which is less than studies done in Northern Amhara region ranges from 25.1% to 31.9%(11–14), 19.7% to 35.2% in Southern Ethiopia (15–17), and 25% to 32.3% in Addis Ababa and western Ethiopia(18–21) and some elsewhere. The possible reason for this discrepancy could be due to the difference in socio-economic status of the populations and the sample size considered in the study.

The odds of developing high blood pressure were higher among older and middle age compared to young age individuals which were 26.75%, 15.13% and 8.13% respectively. This is supported by the study done in North West Ethiopia(11–14), Gondar(3,14), Durame (3,17), Sub-Saharan

Africa(24), Kenya (26)in which older age was associated with hypertension. The possible explanation for this could be due to the fact that the physiologic changes with age contributed to the development of hypertension. High blood pressure related to aging is most likely related to arterial changes, aging results in narrowing of the vessel lumen and stiffening of the vessel walls this turns to high blood pressure.

Also in this surveillance data analysis we observed prevalence of hypertension case was higher in men than female which was 61% and 39 % respectively. And this was supported by several urban surveys in Nigeria have reported a higher prevalence among men; in study among adults in Ibadan North Local Government, the male adults had a prevalence of 36.8% compared to 31.1% prevalence among the female adults(27). Another survey conducted in Lagos city, revealed the prevalence among males was 30.7% while that of females was 26.5%(28). However, the higher prevalence of hypertension among women compared to men has also reported in Tanzania such as a female to male prevalence of 77.7% to 24.4%(29), and 52.3% to 29.2%(28).

4.1.7 Limitations and Challenges

The data obtained is only aggregated data by time , place ,age and sex that is in months and years and lack of proper data,incomplete data by some health facilities,DHS2 reporting system didn't incorporate all relevant variables that that risk factor for hypertension like alcohol, smoking, ethnicity, occupational status and personal behavioral. Disease misclassification like other hypertension unspecified

4.1.8 Conclusion and Recommendation

The overall **5% prevalence** of hypertension in Shashamene town is lower compared to other regions in Ethiopia. Older individuals are at a higher risk of hypertension, prevalence of hypertension higher in male, implement regular hypertension screening programs, especially targeting older individuals who are at higher risk, focus on age-specific interventions that raise awareness about the risks of hypertension in older adults, develop gender-specific health education programs to address the higher prevalence of hypertension in men and promote early detection

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CHAPTER FIVE: SYSTEM EVALUATION

5.1 EVALUATION OF HYPERTENSION SURVEILLANCE SYSTEM, SHEGER CITY, OROMIA, ETHIOPIA, OCTOBER, 2023:MIXED QUANTITATIVE/QUALITATIVE STUDY.

ABSTRACT

Background: Hypertension (HTN) is a significant risk factor for cardiovascular events and a major global health issue. In 2016, approximately 1.13 billion adults were affected and about a billion people, 7.5 million death in 2021 had hypertension worldwide and Two-thirds of them resided in low- and middle-income countries. Despite the significant burden of NCDs, especially hypertension, in Sheger City, no evaluation of surveillance systems has been done. We therefore assessed their performance and key attributes.

Methods: We conducted mixed quantitative/qualitative study design August to September 2023 among 12 health facilities and 12 health Office in Sheger city. The qualitative study included 34 purposively selected key informants, with data collected using updated CDC guidelines for evaluating surveillance systems.

Result: Records from 24 study units were reviewed, with 34 key informants participating. Surveillance data flowed from health facilities to higher levels, but emergency preparedness plans were only available at the district level. Monthly report completeness was 74%, and timeliness was 66%. Supportive supervision and feedback were weak, with no regular data analysis. Stakeholder participation was low, and the system was easy to implement but unrepresentative and inflexible. Documentation and data quality at lower facilities were poor, and stability was hindered by budget shortages, logistics issues, staff turnover, and lack of training updates.

Conclusion: The surveillance system was simple, but attributes like data quality, timeliness, completeness, usefulness, acceptability, flexibility, and stability need improvement. Overall, the performance of hypertension surveillance systems was weak. To enhance performance, recommendations include increasing acceptability, usefulness, regular data analysis, preparing epidemiological bulletins, capacity building, and consistent supervision and feedback.

Keywords: surveillance system evaluation, Hypertension, Sheger city

5.1.1 Introduction

Hypertension (HTN) is a significant risk factor for cardiovascular events and a major global health issue.In 2016, an estimated 1.13 billion adults worldwide had hypertension, about a billion people, 7.5 million death in 2021 had hypertension worldwide and two-thirds of them resided in low- and middle-income countries (1)(2,3). As estimated one-third(1/3)th of adults worldwide have hypertension by 2025, a number will be anticipated to rise by 29% to 1.56 billion, with more than 125 million of those people living in Sub-Saharan Africa(4). The WHO African region has the highest global hypertension rate at 27%. (5). In Ethiopia, NCDs, including hypertension, are the leading cause of age-standardized death rates, resulting in 711 deaths per 100,000 persons annually (95% CI: 468.8-1,036.2), similar to trends in many low-income countries. (6). Hypertension is now a public health issue in Ethiopia, representing 62.3% of cardiovascular diseases and affecting over 20% of adults (4,7).From 1990 t0 2015, Ethiopia's life expectancy increased by 18 years(8), while communicable diseases, maternal and neonatal mortality, and nutritional deficiencies declined(9). However, prevalence of NCD has been increasing time to time(5,10),which was an economic burden analysis shows that economic losses from NCDs (direct and indirect costs) make up 31.3 billion birr per year, which is equivalent to 1.84% of Ethiopia's gross domestic product in 2017,18% probability of dying prematurely from one of the four main NCDs from these all HTN contribution was major one(11).Transitions in epidemiology, demographics, socioeconomics, and nutition have played a significant role in thes increasing trends(12).

Despite growing concerns about NCDs in Ethiopia, there is no national NCD reporting system, particularly for hypertension. As review conducted from 1990 to 2021 in Ethiopia: the prevalence of CVDs ranged from 7.2 to 24%, cancer prevalence was 0.3%, diabetes prevalence ranged from 0.5 to 1.2%, and asthma prevalence ranged from 1 to 3.5%(9). However Over a decade has passed since this assessment, and due to Ethiopia's social and economic changes, we expect a significant shift in NCD prevalence during this time.

By 2013 as African Union stated that,NCD surveillance system evaluation is critical for monitoring and evaluating illness patterns and trends, which is necessary for better NCD prevention and management(13). However, no country achieved all the suggested KPIs for

integrating NCD services into PHC. Only 30% of countries reported having officially approved NCD management guidelines, with even fewer having all essential NCD drugs (13%) and technology (11%) available in PHC facilities.(14).

Following this Federal Ministiry of Health of Ethiopia produced the second version National Strategic plan for the prevention and control of major NCD (2020/21-2024/25)(15). Furthermore, the evaluation considered was primarily concerned with hypertension surveillance system observed health-care settings in Shegercity, Oromia.

5.1.2 Rationale of the study

The hypertension surveillance system in Sheger City has never been evaluated and the status of the public hypertension surveillance system is unknown. Furthermore, the burden remains, and there is generally late detection, reporting, monitoring, and response. As a result, this evaluation carried out to describe the status of the surveillance system's core and supportive operations, to describe the system's unique attributes. The evaluation of hypertension survelliance systems aims to ensure efficient and effective monitoring of public health issues.

5.1.3 Objectives of evaluation

5.1.3.1 General Objective

To assess the hypertension survelliance system and its key attributes, we evaluated its effectiveness in estimating and monitoring the burden of hypertension in Sheger city, Oromia,Ethiopia, from August to September 30,2023

5.1.3.2 Specific objectives

To describe hypertension reporting system, usefulness, public health importance.

To study quantitative attributes of the hypertension reporting system.

To study qualitative attributes of the hypertension reporting system was studied.

5.1.4 Methods

5.1.4.1 Study Setting

Sheger city, the mayor for the new city administration, is located approximately 25 km north of AA.Sebata,Burayu,Gafarsaguje,Malkanono,koyefache,kuradida,Furi,Legatafo,Lededadi,Sululta, ManaAbichu and Gelan towns, are the 12 sub-cities which surround Addis Ababa from all directions, are now clustered as a single city under a single mayoral administration and covers an

area of 160,892.8 hectares. It lies between latitude 8.91971north and longitude 38.76301 with an average annual rainfall 1165mm and. And the administration is operational already as the special zone was created after the census of 2007; it is hard to find correct data about its population. The estimated population size according to the 2007 census conducted by the CSA is 794,489 of which 228,420 or 28.75% were urban dwellers. However, Sheger city health department used total population as 2,873,093 from this 48% (1,379,629) males,45%(1,306,242) females.

The district has twelve woreda health offices, twenty-five health centers, one primary hospital, numerous health posts, and private facilities providing primary healthcare, including public health emergency management. A PHEM officer coordinates surveillance activities at the district level, while PHEM focal persons at health centers manage surveillance and submit weekly reports to the district health office. This study covered different types of health facilities including health centers, health office, and primary hospitals. For this study 12 Woreda health offices, 11 HCs and 1 primary hospital were approached and studied. At each woreda health office, a PHEM officer coordinates surveillance activities in local health facilities. PHEM focal persons at health centers manage these activities and submit weekly reports to the district health office and relevant bodies.

5.1.4.2 Study Design and Period

From August to September 2023, a mixed-methods study was conducted to assess the performance of the hypertension surveillance system in the district. This included a cross-sectional study

5.1.4.3 Sample Size and Sampling Procedure

The study included 24 sites, with the district health office and one hospital conveniently selected, and 11 out of 25 health centers (44%) chosen randomly using a lottery method (Figure 1). A total 24 health facilities (12 health offices, 1 primary hospital and 11 health centers) were included in the study. For the qualitative interviews, purposive sampling was used to select 34 key informants, including the district PHEM officer, 12 health center PHEM focal persons, and 10 health workers. The most senior outpatient department (OPD) workers were interviewed for their valuable insights..

5.1.4.4 Data Collection Method

This study assesses the hypertension surveillance system using the CDC framework and updated guidelines for evaluating public health surveillance systems(16). A semi-structured questionnaire

was created based on the checklist for evaluating public health surveillance systems(16). Data were collected through record reviews, document observations, and face-to-face interviews with key stakeholders. The quantitative survey utilized surveillance reporting formats and records from the district health office and facilities. Qualitative interviews involved the district PHEM officer, health center PHEM focal personnel, and adult OPD workers using a semi-structured guide. The survey assessed the availability of guidelines, report completeness and timeliness, and data quality. Key informants provided insights on system operations, case detection, and attributes like simplicity and stability. Data collection continued until responses reached saturation, indicating no new insights were emerging. (Figure 26).

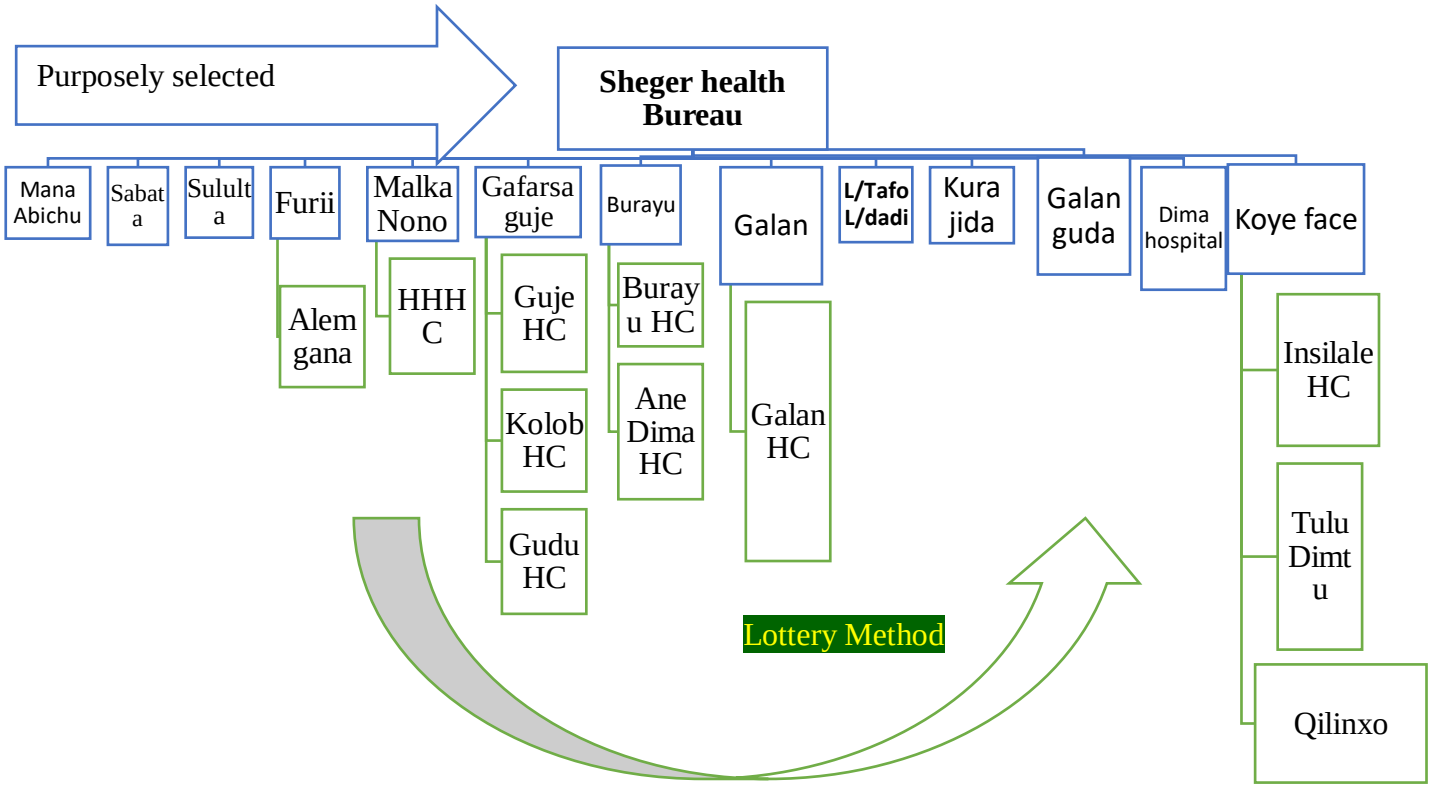

Figure 26:Schematic presentation of sampling method for assessing of hypertension surveillance systems in Sheger city, Oromia, Ethiopia, 2023.

5.1.4.5 Data Quality Assurance

A week reviewed the overall questionnaires was read and discussed the meaning of each word, question and sentences with senior Field Epidemiologists and Field mentors was conducted. The reports and records from health facilities were cross-checked with data from the district health

office to ensure consistency and accuracy. During each visit, stakeholders were informed that the assessment aimed to evaluate the system's performance, not individual performances. Prior to data collection, discussions were held with stakeholders from Sheger City health department and district health office to ensure the evaluation addressed relevant questions and produced useful findings..

5.1.4.6 Data Processing and Analysis

Quantitative data were entered and analyzed using Microsoft Excel 2010, with all questionnaire responses dichotomized except for open-ended questions. Findings were summarized by frequency and proportion. Qualitative data were manually analyzed through thematic analysis, with data cleaned prior to analysis. Qualitative findings were narrated and summarized thematically to complement the quantitative results. Responses to each question were categorized into five groups: Strongly agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly disagree (1). The average score was then calculated for each question and attribute.

5.1.4.7 Ethical clearance

This study was conducted to assess the functionality of the surveillance system for HTN Disease. In addition, the study subject was health institutions which were found in the Sheger city. Therefore, Ethical clearance was not necessary for this study, because there is no direct contact with patients or community. However, latter of consent was written from Oromia regional health bureau(ORHB), Sheger city health department and Woreda health office to visited the woredas and all health facilities.

5.1.4.8 Dissemination of the result

The study results were shared with AAU School of Public Health, EFETP, EPHI, RHB, and visited woreda health offices in both hard and soft copies.

5.1.4.9 Operational Definitions

5.1.4.9.1 Case definition for hypertension

Systolic blood pressure(SBP) readings of ≥140 mmHg and/or diastolic(DBP) readings of ≥90 mmHg on two different days indicate hypertension. (17)(Table 20).

Table 20:Case definition of hypertension

Category of hypertension	SBP	DBP

Normal	≤ 120mmHg	And < 80mmHg
Elevated	120-129 mmHg	And <80mmHg
Stage of HTN		
Stage one	130-139 mmHg	Or 80-89 mmHg
Stage two	≥ 140mmHg	Or ≥ 90 mmHg

5.1.4.9.2 Simplicity

Assessing how easily healthcare workers identified hypertensive cases and identifying any delays or obstacles in the system's functioning, including case definitions, reporting formats, data collection time, and awareness of the hypertension surveillance flow.(16)**.**

5.1.4.9.3 Flexibility

The system's capacity to adapt to changing information needs or operating conditions with minimal extra time, personnel, or funding(16). This study assessed the flexibility of the surveillance system in adapting to changes in procedures, case definitions, data sources, personnel, case detection, and reporting formats.

5.1.4.9.4 Stability

Refers to challenges affecting the system's consistent functioning, such as inadequate reporting tools, personnel, DHIS2 software issues, internet connectivity, or staff availability for surveillance.(16).

5.1.4.9.5 Usefulness

A public health surveillance system is useful if it aids in preventing and controlling health-related events and enhances understanding of their public health implications. Its usefulness was assessed based on actions taken from data analysis, the system's ability to detect diseases and outbreaks, and its estimates of morbidity and mortality.(16).

5.1.4.9.6 Acceptability

Stakeholders' willingness to implement the surveillance system was shown through their active participation in case detection and reporting. Acceptability was measured by the completeness of report forms, data reporting timeliness, and compliance with standard case definitions(16).

5.1.4.9.7 Timeliness

Timeliness of reports was evaluated at two levels: health facilities were considered timely if monthly reports were submitted to the district health office every 21-23 days, and the district was timely if it sent compiled reports to the zonal health department every 24-30 days.(16).

5.1.4.9.8 Completeness

The percentage of health facilities that submitted monthly reports to the higher level compared to the expected facilities in the catchment area (district, PHCU, kebele)(16).

5.1.4.9.9 Data quality and Validity

Was evaluated based on the completeness of reporting formats and the validity of recorded data. (16).Completeness covered the number of cases and deaths, report dates, and blank responses, while validity focused on comparing health facility data with district reports, including variables such as age, sex, weight, smoking status, physical activity, and lipid profiles.

5.1.4.9.10 Sensitivity

Assessing the ratio of cases detected by the DHIS2 system compared to those recorded in health facility registers(16).

5.1.4.9.11 Representativeness

Measured by the distribution of a health-related event over time, place, and person, as well as health service coverage and the reporting of surveillance data from all health facilities(16).

5.1.5 Results

5.1.5.1 Characteristics respondents

Of the 34 health workers interviewed, 58.8% (20 of 34) were state-enrolled as public health officers, 29.4% (10 of 34) were nurses and 11.8% (4 of 34) were public health staff. Among those with the highest level of education, 61.8% (21 of 34) had a degree, while 38.2% (13 of 34) had a master's degree.The median age of respondents was 29 years(ranging from 25 to 36 years), with 70.6%(24 out of 34) being men. Out of the health workers, 83.4% (28 of 34) had more than 5 years, 14.7% (5 of 34) had 3 to 5 years, and 2.9% (1 of 34) had 2 to 3 years of experience**.**

5.1.5.2 Operation of Surveillance

5.1.5.2.1 Communication and Reporting system

The standard flow of surveillance data moves from reporting sites to higher levels. Health posts send weekly reports to cluster health centers every Monday morning via phone. Health centers

then aggregate these reports and forward them to the health office in the afternoon. The district health office receives reports from health centers and sends them to Sheger City Health Department on Tuesday afternoon. (Figure 27). But,he hypertension surveillance system is not fully integrated into routine healthcare and lacks year-round implementation. Community health facilities, especially health posts, are primary information sources. Reports are submitted via phone calls followed by paper submissions. All 11 health centers and one hospital use mobile phones for communication, and the district health office has mobile and Wi-Fi access. Figure 2 illustrates that data flows from health facilities to higher levels, while supervision and feedback flow in the opposite direction.Figure27, the flow of surveillance data and information is from the health facilities to a higher level, whereas supervision and feedback follow the reverse direction.

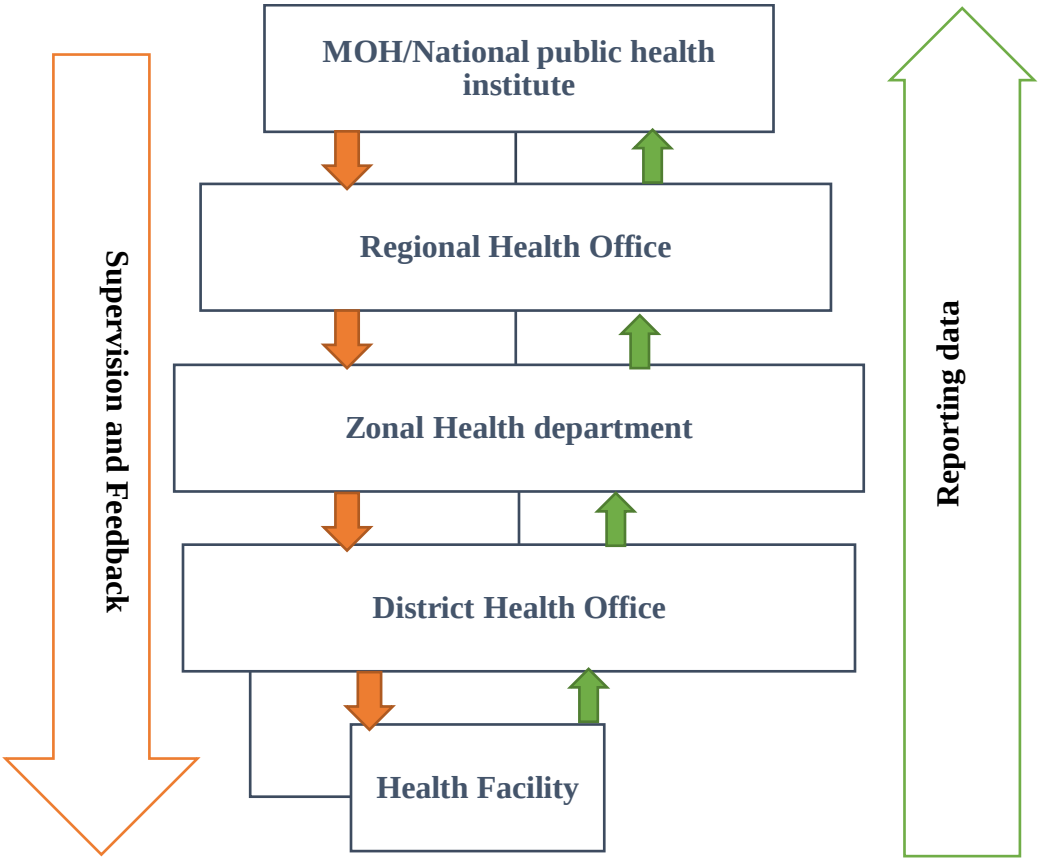

Figure 27:Diagram that shows the flow of surveliance data and feedback in Sheger city district, Oromia, Ethiopia, 2023

5.1.5.2.2 Availability of Surveillance Guidelines,

5.1.5.2.2.1 Documentation and reporting formats

The national PHEM guideline was accessible at the district level and all health centers visited. But, that hypertension guideline was not available separately at all health facility. But there was Ethiopian Primary Health care Guideline (EPHCG). The standard weekly reporting format at the visited health centers did not include any indicators for hypertension. but there was monthly reporting of disease which include hypertension disease indicator. All health centers and the district health office had copies of each monthly surveillance report stored in their file cabinets.

5.1.5.2.2.2 Case Detection and Registration

The case definition for hypertension was not available at the district health office or health facilities, but the PHEM focal person and staff at visited health centers understood it. The hypertension case definition was posted on the wall or notice board of all health centers.

5.1.5.3.Analysis and Interpretation of survelliance Data

All health centers had at least one computer for the health management information system, but none used it for analyzing surveillance data. They submitted monthly reports to the district health office that included only total case numbers and activities, without analysis. The district health office and health facilities lacked a denominator for epidemiological analysis, such as population totals by age, sex, and kebele. Consequently, the district office aggregated reports from health centers and forwarded them to the zonal health department without any data analysis.

5.1.5.4 Supportive Supervision and Feedback

Although the district health office and health centers had a supervision plan, no integrated or specific supportive supervision for hypertension was conducted. None of the study sites had a supervision checklist to assess PHEM activities related to hypertension, and no written feedback from supervision was provided to the district or health centers and hospitals.

5.1.5.5.Assessments of Qualitative Attributes

5.1.5.5.1 Simplicity

Of respondents, 61.8% (21 of 34) were stated and Case definitions for hypertension easily applicable and explained the case definition by their tongue language. 54.7% (18 of 34) and 85.3% (29 of 34) respondents saying the method used for collection of HTN surveillance data were simple in detecting hypertension cases and Reporting of hypertension surveillance data within the IDSR system is easy respectively.67.6% (23 of 34) respondents agreed up on forms for reporting hypertension surveillance data are easy. 55.9 %(19 of 34) respondents stated that

the instructions and guidelines for completing the hypertension reporting forms were not applicable(Table 21).

5.1.5.5.2 Acceptability

58.8% (20 of 34) respondents claimed that hypertension were regarded as significant public health concerns in the community, with the majority of them, 61.7 %(21 of 34) respondents said fellow health personnel in this facility show interest in HTN surveillance activities. And 79.4 % of respondents claimed we had great contribution to detection and screening of hypertension (Table 21).

5.1.5.5.3 Flexibility

79.4 % (27 of 34) Respondents said no change in case definition and 91 %(30 of 34) stated that not changed in reporting of HTN records. And no a new data tool for hypertension case reporting. 100% (34 of 34) total respondents stated HTN surveillance and response within the existing IDSR system easily adapts to changes in technology (Table 22).

5.1.5.5.4 Usefulness

Usefulness stated as not good because 100% of respondents disagree and strongly disagree that hypertension (HTN) surveillance and response within the integrated disease surveliance response(IDSR) system has enabled achievement of the surveillance objectives in the past one year in this woreda.Additionally, almost all of respondents claimed that HTN surveillance data has not informed program implementation for control of the diseases in the past one year in this health facility and the surveillance data generated within the IDSR system hasn't stimulated research activities in this health facility. As almost all were said that Although HTN surveillance and response activities in this health facility are considered important and provides sufficient information for prompt public health action to hypertension within the IDSR systems in this health facility, HTN surveillance data generated within the IDSR system didn't provides an estimate of morbidity magnitude, trends and associated risk factors in this health facilities that used for prevention and control measures(Table 22).

5.1.5.5.5 Stability

91.3% (31 of 34) respondents said there was continues functionality of DHS2 and 90% (30 of 34) of respondents said good internet connectivity. All of them (100%) of respondents said there was availability of BP apparatus. However, all of them (100%) claimed there was an interruption to carry out HTN surveillance system by staff turnover. Overall, the stability of the system has

been undermined by budget shortages, logistical issues, staff turnover, and a lack of updated training.

5.1.5.6 Assessments of Quantitative Attributes

5.1.5.6.1 Timeliness

In the visited health facilities and at the district level, the date of report receipt was not recorded, making it difficult to assess timeliness. However, the overall average timeliness of surveillance reports calculated by all woreda health offices in August 2023 was 63.6%.

5.1.5.6.2 Completeness

In our assessment of the DHIS2 monthly reports, health centers in Sheger City achieved report completeness above the expected 80% for March, April, May, June, July, and August 2023. We were unable to obtain that information from the health office during the data collection period. (Figure 28).

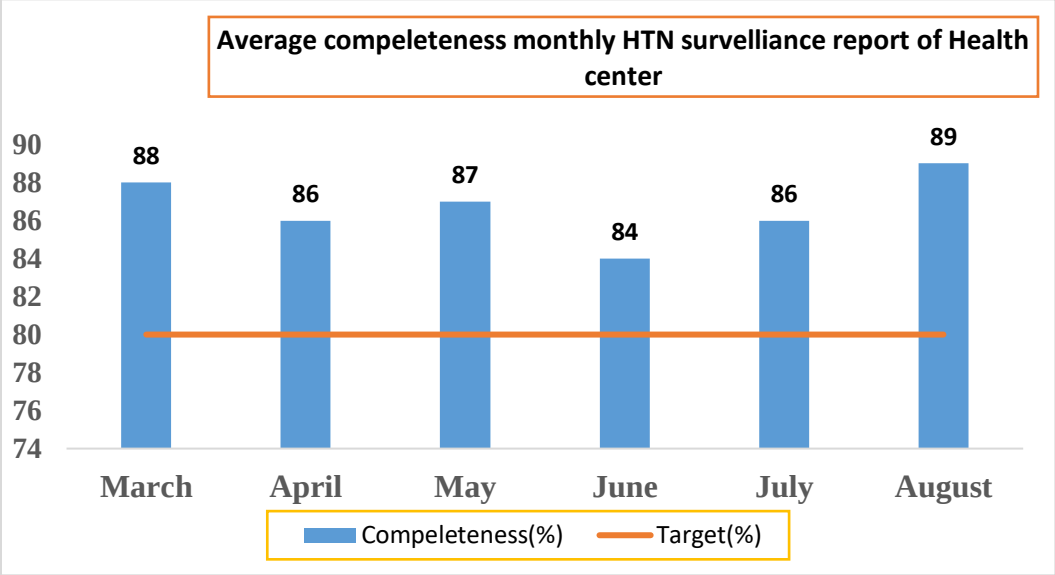

Figure 28:Overall completeness of health centers HTN monthly surveillance report in Sheger city district, Oromia, Ethiopia, from March to August/2023.

5.1.5.6.3 Sensitivity and Data quality

Only 26% (109 of 420 total cases of HTN) were identified by HTN surveillance during mass screening and majority of case identified and recorded during patient passively attended or visited health facility. Regarding data quality proportion of both age and sex recorded were 100% (420 of 420). Report documentation and quality of data was poor at all health facilities.

However, none of them didn't include lipid profile, weight measurement, smoking status and physical activity(Table 23).

5.1.5.7 Discussion

Public health surveillance systems should be periodically evaluated to assess their effectiveness, focusing on attributes crucial to the system's objectives.(16).Hypertension surveillance system performance in Sheger city,Oromia,Ethiopia was evaluated.

The surveillance system was not fully integrated into routine operations. Health facilities in the districts were the key information sources. Data flowed from health facilities to higher levels in a well-organized manner and reporting facilities familiar with communication lines. However, challenges were lack of fully engegement of the system into weekly surveillance activities and a lack of regular communication. Effective public health responses rely on the surveillance system's capacity to deliver reliable, timely, and complete information to guide actions(18,19). As finding of this study revealed, hypertension disease was reported monthly not weekly. The overall completeness of surveillance reports from health centers was 74%. This was below the WHO's target of 80%(18). Our results also differed from the evaluation of the public health syrvelliance system in Northwest Ethiopia's Dangila district, which showed a report completeness exceeding the country's target(20).This suggests that there was not acceptability otf the hypertension surveliance system and not all stakeholders involved in.

At all health facility levels, the report receipt date was not recorded, making it hard to assess timeliness. However, the average timeliness of surveillance reports from all district health offices in August 2023 was 63.6%, below the WHO target of 80%(18). moreover, a study carried out in Northern Ghana reported timeliness in more than 61% of the district health offices(21). Additionally, our study's reporting timeliness fell short of the 95% national target set by the Health Sector Transformation Plan for 2019–20, while a study in Dangila, Northwest Ethiopia, reported a timeliness of 94.6%(20,22). This indicated poor communication. The lower timeliness in the study area may be attributed to inadequate communication between the reporting sites and higher levels.

National guidelines state that surveillance data should be analyzed weekly at all levels, from health facilities to the national level. However, hypertension surveillance data were aggregated and reported monthly, with no monitoring or analysis by health centers, hospitals, or district health offices. Similar findings were noted in Dangila district, Northwest Ethiopia. Effective

analysis is essential for decision-making and public health action. Possible reasons for poor performance in data analysis include skill gaps, weak supervision, lack of commitment, and insufficient ongoing training.

The district health office has an Emergency Preparedness and Response Plan (EPRP). And lacks budget and supplies for emergencies and hypertension surveillance. The rapid response team and multisectoral epidemic management committee are not fully functional, with no documented minutes or evaluations. Our findings align with a study in Dangila district, Northwest Ethiopia. Poor preparedness and response to public health emergencies negatively impact the community. Possible reasons for the rapid response team's dysfunction include lack of capacity building, absence of ownership, and insufficient supervision from higher officials.

Of the seven(7) attributes assessed, sensitivity, data quality, usefulness, acceptability, and timeliness were rated poor, while only simplicity was deemed good. The overall usefulness of the Sheger city surveillance system was considered poor, failing to meet its objectives for monitoring hypertension trends and linking to public health action. The average completeness of surveillance reports was low (74%), and data availability was slow. The system's effectiveness is limited by budget shortages, logistical issues, staff turnover, lack of updated training, and weak supervision. These findings align with studies from Dangila district, Northwest Ethiopia.

5.1.5.8 Conclusions and Recommendation

The district's surveillance system was simple. To increase the system's performance, the surveillance system's; sensitivity, data quality, usefulness, acceptability, and timeliness need to be improved. The total monthly report timeliness, the completeness of the Woreda Health Office and the overall completeness of the health facilities were below the target. The surveillance data flow structure moved from the health center at the bottom to the corresponding upper levels, and the surveillance system was not fully integrated into the standard healthcare delivery system. Nevertheless, there are several shortcomings in the district surveillance system: inadequate channels of communication between surveillance tiers, insufficient surveliance data analysis and interpretation a regular basis, lack of budget, poor supportive supervision and feedback system. To enhance the surveillance system's effectiveness in preventing and controlling hypertension, it's recommended to improve communication, engage fully in routine activities, increase data acceptability and usefulness, regularly analyze and interpret data, prepare epidemiological bulletins, disseminate information to stakeholders, and provide consistent supervision and

feedback. Additionally, health departments in Sheger city should establish functional Rapid Response Teams and epidemic management committees, allocate budgets for surveillance activities, and offer capacity-building training for officials at both district and health facility levels.

Table 21:Implementation Status of the Qualitative Attributes(Attributes(Simplicity and Acceptability) of the Hypertension Surveillance System in Sheger city, Oromia, Addis Ababa, August to September 2023.

Qualitative indicators	Analysis
Simplicity	
Reporting of HTN surveillance easy	85.3% (29 of 34) of respondents claimed easy to report
Forms for reporting HTN	67.6% (23 of 34) of them stated easy to fill the report
Instructions and guidelines	55.9 % (19 of 34) of them said not applicable.
Case definition	61.8%(21 of 34) of them defined case definition
Methods for collection of HTN surveillance data are simply	54.7 %(19 of 34) of them claimed /agreed/.
Method of analysis	60.5 %(21 of 34) of Respondents said easy to analysis of HTN surveillance data
Acceptability	
My contribution/s and input/s to the existing IDSR system is/are considered valuable	79.4 %(27) had contributions.
Fellow health personnel in this facility show interest in HTN surveillance activities	61.7 %(21 of 34) of them said no interest.
HTN are considered of public health	58.8%(20 of 34) of them said HTN have public Health

importance in this community.	importance

Table 22:Implementation status of the Qualitative Attributes(Flexibility and usefulness) of the Hypertension Surveillance System in Sheger city, Oromia, Addis Ababa, August to September 2023

Flexibility	
Changes in case detection	79.4 %(27 of 34) Respondents said no change in case definition
Changes in the reporting of hypertension records	91 %(30 of 34) stated that not changed in reporting of HTN records
Usefulness	
Action taken on data generated	All of them(100%) of respondents said no action was taken on the data
Action taken by authorities	No specific action was taken on the data generated to improve the performance of the hypertension surveillance system
Data analysis	100% (34 of 34) of respondents said they did not analyze hypertension data

Table 23:. Implementation status of quantitative attributes: Sensitivity, Data quality Timeliness of the Hypertension Surveillance System in Sheger city, Oromia, Addis Ababa, August to September 2023

Sensitivity	**%**
Proportion of cases detected by system vs records in register	**26% (109 of 420 total case) identified by HTN surveillance during mass screening**
Data quality	

Percentage of records that include age	100% (420 of 420)
Proportion of records that include sex	100% (420 of 420)
Proportion of records that include smoking status	0% (none of them out of 420)
Proportion of records that include physical activity	0% (none of them out of 420)
Proportion of records that include lipid profile	0% (none of them out of 420)
Percentage of records that include weight	0% (none of them out of 420)
Timeliness	
Proportion of records not reported on time to the monitoring and evaluation officer/DHS2/by those in charge at the health facility	36.8% (155 of 420) of records were not reported on time to the monitoring and evaluation officer/DHS2/
Median time to fill in a hypertension patient form	Average time of 17 min (range, 15–20 min) to fill in the form

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CHAPTER SIX:NARRATIVE DROUGHT ASSESSMENT

6.1 NARRATIVE SUMMARY OF RAPID DROUGHT IMPACT AND RECOVERY ASSESSMENT IN BORANA, EAST BORENA, GUJI, WEST GUJI AND WEST ARSI ZONES, OROMIA REGION,NOVEMBER, 2023.

6.1.1 INTRODUCTION

6.1.1.1 Drought

A drought can result in various environmental, social, and economic impacts. Notably, it can significantly affect human health by reducing both the quantity and quality of water available. This can lead to a higher occurrence of illnesses and diseases, negative mental health effects as people's livelihoods are threatened, and, ultimately, an increase in mortality rates.(1). Droughts are primarily classified into five categories: meteorological, hydrological, agricultural, socioeconomic, and ecological drought. (1). Because of El Niño in 2015–2016, southern Africa, Central America), Ethiopia, Haiti, Indonesia, Papua New Guinea, the Philippines, and Sudan faced severe droughts, resulting millions in need of humanitarian aid. Also Elino raises temperatures and modifies rainfall patterns, which provides favorable conditions for the survival of infectious disease vectors like mosquitoes and waterborne diseases(2). This situation worsens disease outbreaks and alters the spread of infections so that they may reach previously unaffected area. The effects are further extended up to displacement by extreme floods and wildfires may damage and destroy housing and key infrastructure, requiring people and communities to leave their homes, Food insecurity and malnutrition, Crop pests and disease and various Health concerns.

6.1.1.2 Importance of Narrative Summary Drought assessments situation

When a drought happens, it's crucial to understand that many other issues are likely to arise in addition to the immediate health problems that different emergency department will handle it. Damage to homes may occur, occasionally leading to population displacement. The drought may cause survivors to get illnesses or experience other health issues. These issues could lead to

health-related requirements including prescription medication and medical treatment. A thorough understanding of these health demands is crucial since a disaster may have an immediate impact on public health care. Rapid assessment methods are necessary to gather reliable information for decision-making during the recovery phase. Healthcare agencies and policymakers need quick insights into health status to address the needs of affected populations, allowing for prioritization of public health interventions. These tools also guide emergency efforts, such as improving access to medical care, providing financial support, and restoring damaged housing.

Ethiopia has been undertaking emergency needs assessments for human health and nutrition twice a year(the Meher and Belg seasons) in coordination with many sectors, led by the food security and disaster risk management sectors.

Ethiopia conducts emergency needs assessments for health and nutrition twice a year, coordinated by the food security and disaster risk management sectors. In 2023, the Meher assessment aimed to identify areas needing emergency assistance due to unusual weather. To reduce health risks and create a preparedness plan, hazards and vulnerable groups were mapped. Hotspot districts were identified by regional health bureaus and zonal health departments, with assessments conducted in Borena, West Borena, Guji, West Guji, and West Arsi zones of Oromia.

6.1.1.3 Justifications

In response to frequent exposures to natural hazards mostly drought and flooding, the bi annum multi sector assessments led by Ethiopian Disaster Risk Management Commission (EDRMC) has been conducted to zones which are high vulnerable to these natural hazards. During the recent major drought event, eleven zones located in the East, South, South East and central parts of the rift valley areas identified as drought affected zones. The recorded drought affected zones of the region include: Borena, East Borena, Guji, West Arsi, and West Guji zones. The longer dry spell in the Meher season and un seasoned heavy rainfall, man-made disasters including conflicts in some parts of the areas coupled with preexisting history of drought may result with flooding, damage water schemes and crops. These impacts on low crop production, shortage of water, low house hold food security, under nutrition, and increase risks of disease outbreaks. Therefore, conducting, Multi sectors Meher season assessments to drought affected zones are very imperative.

6.1.2 Objectives

To evaluate the outcome of the *Meher* season and its impact on livelihood security in cropping and pastoral areas.

To assess the impact of a specific disaster and evaluate household coping capacity.

To identify areas needing relief assistance this year due to acute issues and estimate the population size and duration of needed support.

To evaluate emergency interventions in agriculture, health, and water, including seeds, livestock vaccines, medicines, and feed support, as well as the type, size, and duration of health and water requirements.

6.1.3 Methods

6.1.3.1 Terms of reference

Utilize livelihood baselines to guide the seasonal assessment by identifying key public health issues and significant outbreaks. Assess the status of emergency preparedness and response, including available supplies. Collect data on nutrition status surveys, malnutrition indicators, disease outbreaks, mortality rates, and behavioral patterns.

6.1.3.2 Study Area

Borena,West Borena,Guji,west Guji and West Arsi are some zones among 20 zones Oromia. Their latitude and longitudes are 4.7677^0 N & 38.3166^0E,5.35168^0N& 39.067E,5.200^0N & 39.3500^0E,7.17N & 38.3916^0E respectively(Figure 29).The total area of the region is 363,399.8 km^2, which accounts for more than 34.5% of the total area the country. According to 2016 Ethiopian fiscal year (EFY), the estimated population of the region is 44,498,048 of which 22,041,687 (49.5%) are females. The subsequent drought for five rounds at East, South and South Eastern parts of the region, (Borena,West Borena,Guji,west Guji and West Arsi) recorded as major disastrous drought in history which resulted with mass loss of human lives and livelihoods. Moreover, the conflict lasts for more than four years in south; result in mass displacements, disruption of health system and impacted on the health of the population. In general, the protracted drought over the last three years coupled with conflicts have impacted on shortage of water, high household food insecurity, high adult and under-five children malnutrition and also provided opportunity for reemergence for climate sensitive public health disease including Malaria, measles and Cholera.

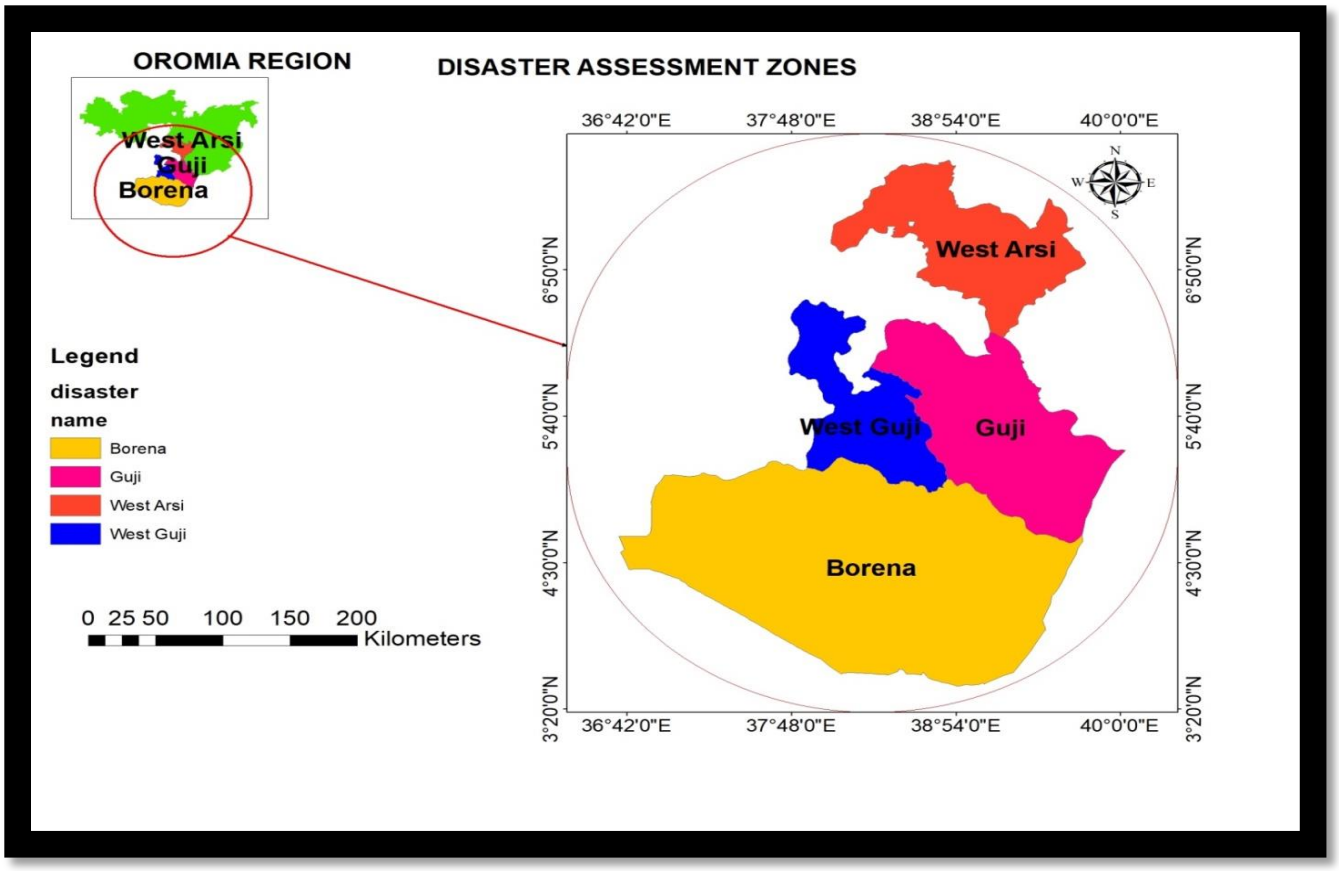

Figure 29:Drought Assessment Area 18 Nov- 08 Dec 2023

6.1.3.3 Study design

A cross-sectional descriptive study was conducted to evaluate human health and nutrition emergency needs for the next six months.

6.1.3.4 Assessment period

Overall, the multi- agency Meher season assessments took a total of 21 days from 18 Nov- 08 Dec 2023.

6.1.3.5 Data Collection Process and Stakeholders Involvements

The multi- agency team comprised of different sectors from government, International Non-Government Organizations (INGOs), United Nations (UN) agencies have participated to the assessments. Prior to deployment to the field, the multi-agency team received a one day orientations on the objective of the assessment and assessment tools. The multi -agency team grouped and deployed to the five drought affected zones which were categorized .Two teams (food and non-food) were formed to evaluate the health situation in three districts.A short

briefing on the assessment conducted by the Zonal and Woreda team provided to the regional multi-agency team. After the briefing sessions, the team conducted field level assessments, document review and interview of community members', observations of health facilities and other service delivery points including CTCs, and stabilization center(SC) sites for verifications and understanding of the existing situation on the ground. Moreover, the team had a debriefing session with Zonal taskforces, discussed on the finding of the field visit and the way forwards.

6.1.3.6 Selection of Assessment Area

Districts were purposefully chosen based on criteria like being priority hotspots, rising malnutrition cases, and trends in cholera, malaria, and flooding.

6.1.3.7 Source of data

Primary and secondary data were gathered from zonal health departments and district health offices through reports, registers, and field observations..

6.1.4 Assessment findings

6.1.4.1 Coordination:

Zonal multi-sectoral coordination was functional, led by the zonal administrator with the health department head as secretary. The committee, including government and NGO sectors, meets weekly to discuss emergencies, particularly food security and rising malnutrition. However, coordination in the visited woredas was lacking.

6.1.4.2. Outbreak

An outbreak was ongoing, with malaria and cholera cases sharply rising in November in West Arsi. Due to unusual weather conditions, health officials expect malnutrition, malaria, and AWD to pose public health risks soon.

6.1.4.3. Public Health Emergency Management

At the zonal level, there is a public health and nutrition emergency preparedness plan with a budget, but no staff received training in PHEM basics, RRT, or emergency nutrition management during the assessment period.

6.1.4.4 Stock

During the assessment, only therapeutic supplies were available; essential drugs and medical supplies were lacking to address potential public health emergencies like meningitis, measles, malaria, and AWD. Major public health concerns identified included cholera, measles, malnutrition, and malaria.

6.1.4.5 Health information and Infrastructures,nutrition, diseases and disaster conditions

6.1.4.5.1 Health information and Infrastructures

Health and health related background information comprises of the population and different sections of the population, health infrastructures and others. Because of its location, natural and man-made disasters, and other factors, some health infra-structures may be damaged. During the assessment, 69 health facility found in west Guji were damaged by conflict and currently non-functional(Table 24).

Table 24:Number of damaged health facilities West Guji,Oromia,2023

No	Woreda	Health Facility damaged due to Conflict		
		Partial damaged	Fully damaged	Total
1	Melka Soda	2	2	4
2	Bule Hora	9	17	26
3	Kercha	12	0	12
4	Suro Barguda	8	0	8
5	Abaya	1	1	2
6	Dugda Dawa	3	0	3
7	Birbirsa Kojowa	2	0	2
8	Gelana	5	7	12
	Total	**42**	**27**	**69**

6.1.4.5.2 Cholera

Cholera is one of the major public health concerns reported by the most of drought affected zones visited by the multi-agency team. Except few woredas, majority of the selected woredas visited by the team had either history of recent outbreak or are currently with active cholera outbreak. During the last six months from June-Nov 2023, a total of 26 woredas in the 2 drought affected zones were reported cholera outbreak cases. Overall, out of 2,231 cases and 26 deaths (CFR 1.17%) reported of ten drought affected zones. Compared with the last year's similar

period, the numbers of zones and woredas affected by the outbreak and the numbers of cases reported were extremely increased. In the year 2022, during the same period, only seven woredas from the three zones namely, west Arsi, East Borena and Guji zones were affected by the outbreak. Only 288 cases and 3 deaths (CFR 1.04%) were reported of these zones in the last year during similar period.

The key determinants factors for the spreading of the outbreak raised by zones and woredas were include lack of access to clean water, low hygiene practices by the communities, low coverage of latrine and high population movement at the area. In response to the outbreak, zones and woredas have been taking extensive preparedness and response activities to contain the outbreak. These were include: establishing multi sector response taskforces, deployment of RRTs, distributions of water treatment chemicals, active case searching and reporting, establishment of CTCs and treatment of cases, awareness creations and other community based interventions. However, during the field assessments, the multi-agency team were observed and identified, discrepancy of data, under reporting of actual cases, week coordination, and low house to house visit and monitoring water treatment chemicals utilisation as major gap.

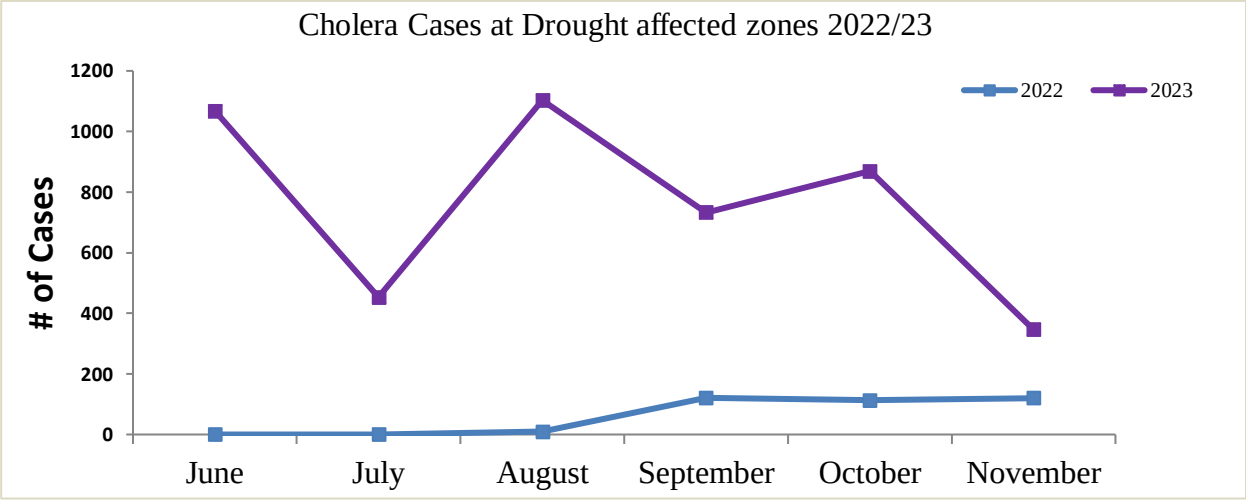

Figure 30:. Cholera Outbreak Situations at drought affected zones in the Last six months

6.1.4.5.3 Measles

Measles are one of the highly contagious infectious diseases and primarily considered as indicator of humanitarian public health emergency. During the last 6 months from June- Nov 2023), a total of 17 woredas in the five drought affected zones have been reported cumulative of 857 measles cases and 3 deaths (case fatality rate(CFR) 0.12%). Overall, a total of 7 woredas are currently with active measles outbreak(Table 25).

Table 25:Measles outbreak situations in the drought affected zones in the last 6 months 2023

Drought affected zones	Cases	Deaths	CFR %	# of Woredas affected	# of Active Woredas	Remarks
Guji	25	0	0.00	2	0	
West Arsi	360	1	0.28	9	1	
West Guji	472	0	0.00	6	6	
Grand Total	**857**	**1**	**0.12**	**17**	**7**	

In the last year's similar year, out of 857 measles cases and 1 death (CFR 0.12%) reported from 14 woredas of two droughts affected zones. Comparing with last year's similar period, the numbers of measles cases and deaths were declined by 33.6% and 51% respectively. However, the numbers of affected zones and woredas have shown no significant difference compared with the last year's similar period

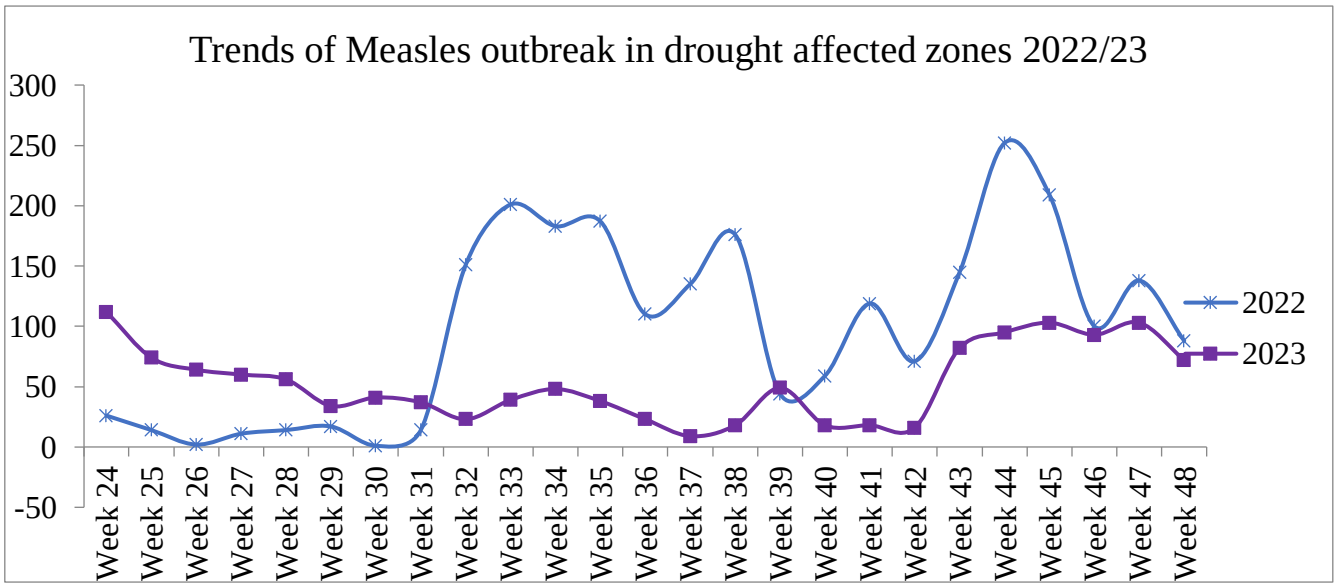

Figure 31:Trend of measle cases by WHO Epi-weeks at drought affacted zones,Oromia,2023

6.1.4.5.4 Nutrition

Significant increase of under nutrition among under < 5 children and Pregnant and Lactating Women (PLW) has been recorded at the identified drought affected zones following the major drought emergency over the past 2 years. Following resumptions of rainfall, it was observed that, there are slight improvements in under nutrition cases over the past six months.But, there are disparities in number of < 5 malnutrition cases among the zones. Moreover, there are woredas which are reporting significant numbers of under nutrition cases and need critical (Figure 32).

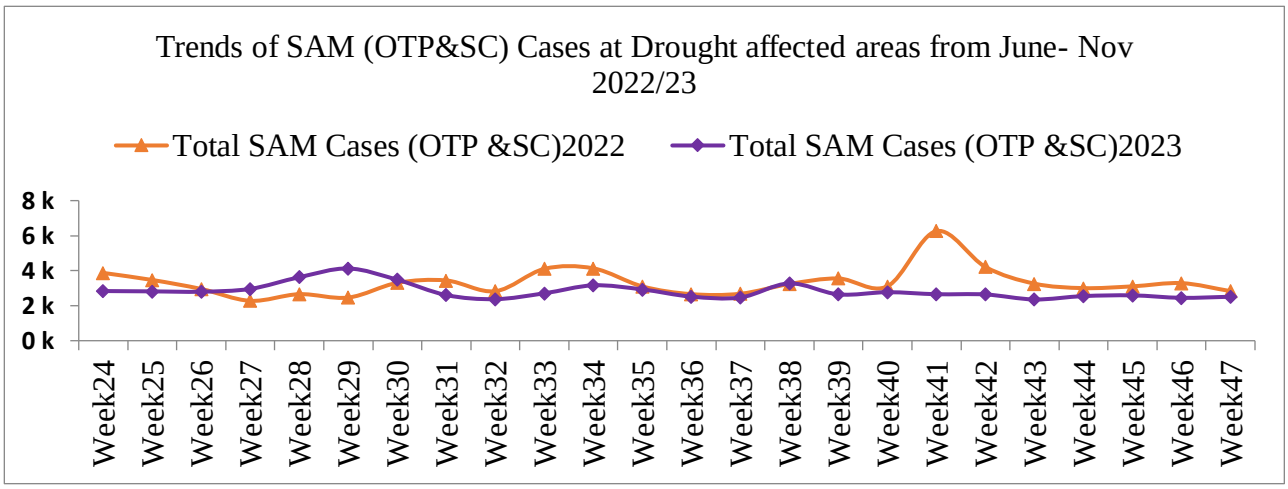

Figure 32:Trends of SAM (OTP&SC) Cases at Drought affected areas, Oromia,from June-Nov 2022/23

nutrition interventions. Overall, in the last six months from June- Nov 2023, a total of 12,114 sever malnutrition(SAM) cases identified at the five drought affected zones of with 10,258 (84.68%) were admitted to outpatient therapeutic programme (OTP) and the rest 1,856 (15.32%) were admitted to SC. Moreover, it was observed that, there is high under nutrition rate in some woredas(Table 26).

Table 26: Under 5 years old child and PLW malnutrition screening at drought affected zones,Oromia,from July-October/2023.

Average <5 Nutrition Screening (June- Oct 2023)						
Drought affected zones	Target Children 6-59 months	Total Screened	SAM	MAM	Proxy GAM rate (%)	Remarks
Borena	442,845	396,091	2,104	53,242	13.97	July- Oct 2023

Guji	238,125	104,852	13,258	4422	16.86	
West Arsi	2,195,060	1,801,305	13,801	110,455	6.90	June- Sept 2023
West Guji	1,131,040	969,414	12,114	99,496	11.51	
Average PLW Nutrition Screening (June- Oct 2023)						
Drought affected zones	Target PLW	# of scrrened PLW	Coverage	# of PLW MUAC below 23.0 cm	% Proxy MAM for PLW	
Borena	87,388	134,700	154.14	60,524	44.93	July- Oct 2023
Guji	484,650	331,420	73.41		21.33	June- Sept 2023
West Arsi	318,713	323,513	68.38	70679	23.15	
West Guji	514,960	568,524	101.51	74883	30.36	

6.1.4.6 Challenges

- Weak Woreda level health and Nutrition emergency coordination
- Under reporting/no reporting of cases/public health event
- Low data quality
- Low Nutrition screening
- Shortage of Supplies [F100, RUSF, CSB++]
- high case admission of AM
- Ongoing Multiple of Outbreaks (Cholera, Measles,)
- Weak Monitoring and evaluation system [SS from woreda]
- Bad road condition especially for IMAM allocation

6.1.4.7 Recommendations

- Strengthen multi sector performance monitoring, and supportive supervision
- Prepare and implement comprehensive integrated emergency response plan

- Strengthening surveillance and emergency preparedness
- Close follow up on reporting of public health events
- Early investigations and response of the public health event
- Improve data quality (Discrepancies in reporting)

6.1.5 WASH

Water and climate change are closely interconnected. Climate change influences water through various complex mechanisms, including erratic rainfall patterns, floods, and droughts. Climate change is intensifying water scarcity and water-related hazards like floods and droughts, as rising temperatures disrupt precipitation patterns and the overall water cycle.. In the visited eleven (5) zones the spatial and temporal distribution of the rainfall is highly uneven due to climatic variability and thus it falls either ahead of time or comes too late or even stops short in mid-season for the past five or more consecutive seasons. This affected have critically affected the water sources. Many water sources have been dried and water table leaving very low water discharges.

There are a total of 358 water supply schemes in those affected zone and. Out of these schemes, 70 (20%) of them are not functional and 12,933 (80%) are functional. Most of big non-functional schemes are mainly due to generators and pumps damage, pressure/distribution line damage, switchboard damage, shortage of spare parts, shortage of service rig, and dryness of sources which resulted ground water table to go far. The main protected water sources are motorized boreholes, hand dug wells, shallow wells and motorized & gravity springs. Majority of the population in those zones are using unprotected water sources (River, Ponds/Ella's/traditional water wells).

The drinking water supply coverage of Borena zone 34.61%. Majority of the population in these zones is using unprotected water sources (River, Ponds/Ella's/traditional water wells). From the information gathered there are about 54 Ponds/Ella's/traditional water wells in affected woredas and all of them are currently containing water. This will serve the community for the next two to three months.

Majority of the woredas got Belg /Arfassa/ rain for the last four consecutive months of the year 2023 (February, March, April and May) when compared to that of the Meher/Ganna rain season. Hence, there is no critical water supply shortage problem. However, majority of the community use these unprotected water sources (River, Ponds/Ella's/traditional water wells) for drinking and

household cooking purposes. This may lead to the outbreak of different waterborne diseases and sanitary challenges.

6.1.5.1 WASH Related Challenges

- The susceptibility of water supply to climate change is worsening both water scarcity and water-related hazards such as floods and droughts.
- Most water supply schemes stop and about to stop supplying water due to the escalating price of fuel for generator.
- The rising electric power tariff is a major challenge for functioning water supply schemes.
- Non-functionality of water schemes are aggravating the shortage of potable water supply in drought prone woredas.
- Most water sources (Boreholes, springs, shallow wells, hand dug wells) dried due to the effect of climate change.
- In adequate supply of water purifying chemicals.
- In adequate supply and escalating cost of electromechanical tools, fittings, etc.
- Availability and Inaccessibility of water sources which leads rural communities to travel long distances to fetch water (more than 6hrs per day).
- Inadequate supply of service rig for immediate schemes maintenances.
- Absence of no regular water quality test in rural areas (Collaboration with Health)
- Problems related to operation and maintenance of water supply schemes in the woredas (Community, schools, camps, health institutions) due to lack of different equipment.

6.1.5.2 Recommendations

- Promoting water shade management and source protection initiatives to combat the effect of climate changes.
- Urgent maintenance and rehabilitation of non-functional water schemes.
- Water purification chemicals should be supplied timely and adequately.
- Fuel generators should be replaced by hybrid solar power systems.
- Discussion has to be made with electric supplying corporation on ‘power tariff’ since WASH is a service delivery sector (Not profit oriented sector).
- Maintenance and rehabilitation of the damaged and silted ponds and “Ella's”.

- Close monitoring of the water level in the ponds for timely response to the water shortage,
- Regularly disinfect water schemes and reservoirs
- Capacitating maintenance capacity of Woredas and zone both with technics and equipment
- More emphasis should also be given for the monitoring of beneficiaries utilization status to ensure effective use of the kits/chemicals.
- Develop new additional potential water scheme/on-spot Boreholes for emergency purpose
- Provision of adequate emergency budget to fully execute emergency WASH response activities at all level and monitor its utilization.

6.1.6 Stock

6.1.6.1 Summary of Health Emergency Needs

During assessment period, there was a lack of adequate essential drugs and medical supplies, other essential commodities of water related logistics and supplies and to treat and control for significant public health crises such as, Malnutrition, measles, malaria and Cholera.

Table 38: Preparedness: by medical supplies for Five Drought affected (Borena,East Borena,West Arsi,Guji and West Guji Zones) 2023 G.C.

S. N	Medical supplies	Unit	Total needs	Stock on hand	Gaps
1	RL fluids	Bag	14,910	3,571	11,339
2	Doxycycline	Capsule	15,361	2,018	13,343
3	Ceftriaxone	Vial	4,537	1,432	3,105
4	Paracentamol(PCM)	Strip	10,765	6,543	4,222
5	ORS	Sacket	38,901	11,912	26,989
6	CTC Kit	Number	37	3	34
7	Amoxicillin syrups	Bottles	76,542	12,643	12,643
8	Syringes and gloves	Box	89	32	57
9	TTC ointment	Tube	4,432	1,872	2,560
10	Vit A	Tube	451,389	238,710	212,679

11	Coartem	Capsule	7,252	3,083	3,552
12	Artemether(IM)	Vial	5,340	433	4,907
13	Artesunate(Inj)	Vial	1,360	560	800
14	Artesunate(rectal)	Dose	1,250	321	1,218
15	Quinine(IV)	Box	26	3	23
16	Quinine(po)	Tin	74	0	74
17	RDT for malaria	Number	239,721	72,890	166,831
18	Thermometer	Number	2,310	1,238	1,072
19	Mebendazole	Tablets	740,872	267,820	473,052
20	Albendazole	Tablets	387,610	14,321	373,289
21	Amoxicillin	Tablets	543,218	124,826	418,392
22	Weight scale	Number	62	13	49
23	Soaps	Box	3,987,500	85,742	3,901,758
24	MAUC apparatus	Number	23,412	5,432	17,980
25	RUFT 100	Sacket	3,896,523	754,381	3,142,142
26	RUSF(Fortified Blended Food-FBF)	Box	2,674,382	432,187	2,242,195
	Total				

6.1.6.2 Summary of WASH Emergency Needs

- **For Maintenance and Rehabilitation Need:** a total of 110,852,448 ***Birr*** is needed. This will benefit 1,737,064 people (Table 6).
- **For New Borehole Drilling Need:** A total of 68,249,140 ***Birr*** is needed. This will benefit about 501,747 people (Table: 7).
- **Water Purifying Chemical Demand:** Purifier 17,341 carton, Aqua tab 5,916 carton, Bishan Gari 20,297 carton, Wuha Agar (Water Guard) 9,174 carton, HTH 100 drum urgently needed for 3,445,261 people in 11 zones. A total of **9,702,705 *Birr*** is needed (Table: 8).
- **Nonfood Items Demand:** 542 Rotto ($10m^3$ 291 & $5m^3$ 251), 48 EM tool kits, 13 EMY kit, 734,243 buckets, 1,468,486 Jericans, 11,013,645 washing soaps, 11,013,645 bathing

soaps. A total of ***337,005,900 Birr*** is needed. This will serve about 734,243 HHs (Table: 9).

- **Water truck Demand:** Currently**,** except some critical woredas there is no water shortage in majority woredas. Majority of the ponds filled with water. However, there is a threat that the current water storage in ponds will no longer serve more than a maximum of two months, again the rain condition may reduce or discontinue as the same as today. On other way there is case of Cholera in most woredas. Therefore, there will be a need for about 204 Water Trucks for the Drought, Cholera, and Conflict affected 94 woredas. A total of ***365,367,487 Birr*** needed. This was serve a total of 2,982,906 people (Table: 10).

Flood Affected Schemes: 6 Boreholes, 14 Springs and 4 water treatment plants in more than 25 woredas of 9 zones (East Shoa, Bale, West Hararghe, West Arsi, East Bale and East Borena) which affected by heavy flood needs immediate supply of Electromechanical equipment, maintenance, and rehabilitation A total of ***217,513,613 Birr*** needed. This will serve a total of 306,653 people (Table: 5).

Table 27:ater Supply Coverage of Affected Zones (5)

No	Zones	Zonal Population	Water Coverage (%)		
			Rural	Urban	Total
1	Borena	1,500,000	20.31	44.30	34.61
2	East Borena	1,003,225	24.70	28.00	36.40
3	Guji	1,648,809	62.77	70.72	64.09
4	West Guji	2,157,769	36.8	45.4	41.10
5	West Arsi	2,926,749	68.24	66.24	67.24
	Total	**9,236,552**	**35.20**	**41.85**	**48.69**

Table 28:Existing Water Supply Schemes and Status

No	Zone	Water Supply Schemes Status			
		Total	Functional	Non-Functional	Non-Functionality Rate (%)
1	Borena	524	417	107	20.42
2	East Borena	431	327	104	24.13

3	Guji	716	619	97	13.55
4	West Guji	1,433	1,028	398	27.77
5	West Arsi	2,625	2,503	122	4.65
	Total				

Table 29:Existing Ponds /Traditional Wells Status for Drought/Cholera Affected Woredas

No	Zone	Affected woredas	Affected kebeles	Pond/Traditional wells/Haro/ status		
				Total Ponds	Ponds with Water	Ponds with no Water
1	Borena	10	27	104	104	0
2	East Borena	9	36	267	234	33
3	Guji	6	28	105	65	35
4	West Guji	7	32	68	54	14
5	West Arsi	5	46	0	0	0
	Total					

Table 30:Population Need Emergency Drinking Water (Drought, IDPs, Cholera, etc.)

s.no	Zone	# woreda	# kebeles	# of Population Affected				#of Popn at Risk				Remark
				HH	**males**	**Females**	**Sum**	**HH**	**males**	**Females**	**Sum**	
1	Borena	10	27	61,169	159,038	146,805	305,843	85,450	146,805	159,038	305,843	Dro…
2	E.Borena	9	36	54,409	141,463	130,582	272,045	191,321	130,582	141,463	272,045	Dro…
3	Guji		28	69,502	180,706	166,806	347,512	88,753	166,806	180,706	347,512	Dro..
4	West Guj	7	32	63,223	164,380	151,735	316,115	85,235	151,735	164,380	316,115	Dro.., IDPs

5	West Ars	5	46	55,755	144,963	133,812	278,775	61,950	133,812	144,963	278,775	Dro,cholera,
Total		**37**	**169**	**30,4058**	**790550**	**729,740**	**1,520,29**	**375,79**	**729,740**	**790,550**	**1,520,29**	

Table 31:Water Purifying Chemicals Need per Zone

No	Zones	Affected Woreda	HHs	Population at Risk	Water Purifying Chemicals					Estimated Budget (Br)
					Purifier (Carton)	Aqua Tab (Carton)	Bishan Gari (Carton)	Wuha Agar (Carton)	HTH 50kg (Drum)	
1	Borena	10	85,450	305,843	500	1,978	500	7,236	10	2,773,665
2	East Borena	9	54,409	272,045	2,130	631	511			1,692,600
3	Guji	6	88,753	347,512	150	277	474	100	15	1,970,355
4	West Guji	7	85,235	316,115	150	200	200	100		1,359,810
5	West Arsi	5	61,950	278,775	8,423	205	200	275	15	1,906,275
	Total	**37**	**375,797**	**1,520,290**	**11353**	**3,291**	**1,885**	**7,711**	**40**	**9,702,705**

Table 32:Non Food Items (Roto, EM kits, Bucket, Jerrican, and Soap) Demand

No	Zones	HHs	Roto		EMY kit	EM kit Tools	Bucket	Jerrican	Washing Soap	Bathing Soap	Estimated Budget (Br)
			$10m^3$	$5m^3$							
1	Borena	85,450	40	30			85,450	85,450	170,900	1,281,750	16,179,300
2	East Borena	54,409	50	25	3	32	54,409	54,409	108,818	816,135	24,484,050
3	Guji	88,753	30	35		5	88,753	88,753	177,506	1,331,295	9,056,250
4	West Guji	85,235	20	20			85,235	85,235	170,470	1,278,525	28,450,350
5	West Arsi	61,950	50	50		3	61,950	61,950	123,900	929,250	19,912,500
	Total	**375,797**	**190**	**160**	**3**	**40**	**375,797**	**375,797**	**751,594**	**5,636,955**	**98,082,450**

Table 33:Water Truck Demand for Each Zone

No	Zones	Affected Woredas	Affected Kebeles	Affected People	Water Truck Demand	Estimated Budget (Br)
1	Borena	10	27	305,843	14	24,125,475
2	East Borena	9	36	272,045	13	23,253,210
3	Guji	6	28	347,512	16	28,452,125
4	West Guji	7	32	316,115	15	27,854,672
5	West Arsi	5	46	278,775	21	39,857,450
	Total	**37**	**169**	**1,520,290**	**79**	**143,542,932**

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CHAPTER SEVEN: MANUSCRIPT

7.1 Cholera Outbreak Investigation And Response At Haramaya Woreda, East Hararghe, Oromia Region, Ethiopia, 2023. /case-control study/.

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ABSTRACT

Background: Cholera remains a disease of public health importance in Ethiopia associated with high morbidity and mortality. In August 2016, East Hararghe Zonal Health Bureau was notified of an increase in suspected cholera cases in Haramaya woreda.Oromia health bureaus' surge teams and Field epidemiology residents' were deployed to investigate the outbreak with the objectives of verifying the diagnosis, identifying risk factors and make appropriate control measures to control the outbreak.

Methods: We conducted an unmatched case-control study. We defined a cholera case as any person aged 2 years or older presenting with acute watery diarrhea and severe dehydration or dying from acute watery diarrhea in Haramaya community and/or in areas where a cholera outbreak has been declared, any person presenting with or dying from acute watery diarrhea. We identified community controls. A total of 50 cases and 100 controls were recruited. Structured questionnaires were administered to both cases and controls. One stool samples from case-patients and 14 water samples from the community water source were collected for laboratory investigation. We performed univariate, bivariate& Multivariate analysis using statistical package software for social science version 26.

Results: The mean age of cases and controls was 18.60 years and 19.60 respectively. Females constituted 62 % (cases) and 51 %(controls). The attack rate was about 1.9 per/10,000 peoples with a CFR of 4%.Drank from unprotected natural spring water (AOR 16.02, 95% CI: 6.02–30.06), eating raw vegetable (AOR 2.4, 95% CI: 2.10–6.80),were independent associated predictors.While, latrine usage OR: 0.79, 95% CI;0.351-1.785), use chlorine (OR 0.752,95%CI;0.378-1.497), having knowledge about cholera transmission AOR 0.21, 95% CI: 0.05–0.83), & Good hand hygiene (OR 0.527,95%CI:0.256-1.084) were found to be protective.

Conclusion & Recommendation: V.cholerae was the cause of the outbreak in Haramaya. Drinking water from unprotected natural spring water, didn't use chlorine, lack of knowledge on ways of prevention and poor hand hygiene were significantly associated with the outbreak. We initiated hand hygiene and water treatment to control the outbreak.

Keywords: Unmatched case control ,Cholera outbreak, Hand hygiene, spring water,Haramaya

7.1.1 INTRODUCTION

7.1.1.1 Background

Cholera is a diarrheal bacterial infection caused by the gram-negative *Vibrio cholerae* (types O1 or O139), affecting both children and adults. It is a key indicator of social development and remains a challenge in areas lacking safe drinking water and sanitation.(1,2). Cholera spreads via the fecal-oral route, requiring over a million organisms to cause disease. Most cases arise from contaminated food or water, while transmission through touch, such as contact with patients, is rare.(3). Water may be contaminated at its source. Surface water and water from shallow wells are common sources of infection. Vibrio cholerae can live for years in certain aquatic environments. Water is frequently contaminated at home when inadequately washed hands come in contact with stored water. Bathing or washing cooking utensils in contaminated water can also transmit cholera(4). Cholera is frequently spread through moist grains. Foods that have been cooked but are still somewhat contaminated after a few hours at room temperature create a perfect environment for Vibrio cholerae to flourish(5). Raw fruits and vegetables, raw shellfish, and raw or undercooked seafood are additional items that can spread cholera. Through the waste products, cholera patient corpses are extremely contagious. While attending funerals, physical touch is another important media. Cholera treatment centers can become main sources of contamination if hygiene and isolation measures are insufficient. Acidifying foods with lemons, tomatoes, yogurt, or fermented milk helps to inhibit Vibrio cholerae growth(6).

The WHO estimates 3 to 5 million cholera cases and 100,000 to 120,000 deaths annually worldwide. (7).Even though water and sewage treatment systems have mostly eradicated cholera from industrialized nations more than many years ago, the majority of cases and deaths of cholera worldwide in the twenty-first century are found in sub-Saharan Africa and also endemic too(8–10). The Case Fatality Ratio (CFR) consistently exceeds the WHO-recommended 1%, averaging 2.2%, with around 23 countries affected each year. (9–11). Between January 1, 2022, and July 16, 2023, fourteen African nations reported over 213,443 cholera cases and 3,951 deaths, with a CFR of 1.9%.(9). Numerous cholera cases and outbreaks that might spread across nations have a significant impact on the region. Africa continues to have a greater rate of reported cholera case deaths than any other continent. This illustrates how cholera's straightforward rehydration therapy treatment contributes to a lack of access to basic health care(9).

In Ethiopia 26,398 cholera cases including 362 deaths reported between 27 August 2022 and 1 November 2023.The majority of cases are reported from Oromia region followed by South Ethiopia,Amhara,Somali,Sidama,Afar,Central Ethiopia, Diredawa,Benishangulgumz and Harari.

7.1.1.2 Statement of the Problem

Cholera continues to pose a global public health threat, disproportionately affecting the poorest and most vulnerable populations(7). New cholera outbreaks can arise anywhere with poor water supply, sanitation, and hygiene. The risk is heightened during humanitarian emergencies with large population movements and overcrowding, along with disrupted access to healthcare and clean water. Due to a short incubation period of 2 hours to 5 days, cases can rapidly increase, leading to many deaths and an urgent public health crisis.(8). Areas with poor sanitation, limited access to safe water, and inadequate hygiene are at high risk for cholera transmission. Limited healthcare access and inadequate treatment contribute to high mortality, with case fatality rates potentially exceeding 50% if untreated. Originating in the Ganges delta, cholera spread globally during the 19th century through six pandemics, with the current (seventh) pandemic starting in South Asia in 1961 and reaching Africa in 1971 and the Americas in 1991. Cholera is now endemic in many countries, but it is preventable and treatable.

WHO estimates approximately 2.86 million cholera cases annually in endemic countries (range: 1.3 million to 4.0 million), leading to about 95,000 deaths (range: 21,000 to 143,000).)(12).

Africa has been significantly impacted by the ongoing seventh cholera pandemic. Despite its resurgence in 1970, cholera remains a serious public health threat, characterized by high fatality rates, frequent outbreaks, and endemicity, particularly around the central African Great Lakes, which may act as reservoirs. Cases occur year-round, with spikes during the rainy season. Other sub-Saharan regions experience varied outbreak sizes, with a constant risk of widespread transmission.(10).

Even though water and sewage treatment systems have mostly eradicated cholera from industrialized nations more than a century ago, the disease is still a major source of illness and mortality in many African nations. The majority of cases of cholera worldwide in the twenty-first century are found in sub-Saharan Africa. Numerous cholera cases and outbreaks that might spread across nations have a significant impact on the region. Africa continues to have a greater rate of reported cholera case deaths than any other continent. This illustrates how cholera's straightforward rehydration therapy treatment contributes to a lack of access to basic health care.

Improving cholera treatment access to primary healthcare as well as prevention through better water and sanitation systems are two issues that many African nations must simultaneously address(9).

According to the WHO, in 2019, the global age-standardized cholera mortality rate was 1.66 per 100,000 for males and 1.60 for females, with the highest rates in the African Region (12.29 for males and 10.53 for females) and the Eastern Mediterranean Region (2.92 for males and 3.17 for females).)(7).

From August 27, 2022, to November 1, 2023, approximately 26,600 cholera cases were reported in regions including Afar, Amhara, and Tigray, resulting in 357 deaths (case fatality rate of 1.34%). The outbreak is exacerbated by drought in southern Tigray and flooding in Somalia and Dire Dawa, highlighting the need for increased WASH response.(13).

Insufficient funding, limited WASH partners in certain regions, shortages of OCV doses and cholera treatment kits, and a lack of water quality testing resources hinder the response. Additionally, there are gaps in technical expertise, WASH services, and community outreach. Increased engagement from development partners is essential to improve community resilience and tackle the root causes of outbreaks.(14).

All regions require enhanced technical support, particularly in training health workers for effective management, active surveillance, reporting, and cholera case management. Additionally, logistics support is inadequate in most affected areas, hindering the transport of supplies and personnel for monitoring and surveillance activities.(14).

7.1.1.3 Significance of the study

Cholera is an immediately reportable disease included in routine surveillance at national and international levels due to its significant public health importance, as recognized by the International Health Regulations.(15). All suspected cholera cases must be reported immediately to the relevant public health emergency management office. An epidemic threshold occurs when a single strain of Vibrio cholerae is isolated.Since December 29, 2023, Oromia and East Hararghe zones, particularly Awumera kebele, have reported suspected and confirmed cases. In response to requests for support, a multidisciplinary team was deployed to East Hararghe zone to describe the outbreak's morbidity and mortality and implement control measures.

7.1.2 Objective

7.1.2.1 General objective

To describe the cholera cases by time, person, places, determine potential risk factors and control measures implemented in Haramaya woreda,East Hararghe zone, Oromia, Ethiopia, from 28 August to 17 October,2023.

7.1.2.2 specific objective

To describe the cholera cases by time, places and person

To determine potential preditors

o describe outbreak control measures

7.1.3 Methods

7.1.3.1 Study location

The study took place in Haramaya woreda at the Cholera Treatment Unit (CTU) and surrounding communities, located 530 km from Addis Ababa, Ethiopia's capital. (Figure 33). The estimated population of Haramaya woreda in 2023 is 267,558, with 129,792 men and 137,766 women, and a population density of 151.87. According to a World Bank memorandum from May 24, 2004, 16.5% have access to electricity, with a road density of 39.6 km per 1,000 sq km, above the national average. The average rural household has 0.5 hectares of land, lower than the national and regional averages. Only 13% of the population is employed in non-farm jobs, compared to national and regional averages of 25% and 24%, respectively. In education, 53% of eligible children are enrolled in primary school and 10% in secondary school. Health-wise, 44% are exposed to malaria, with no exposure to Tsetse flies. The woreda has a drought risk rating of 367. The Public Health Emergency Management team (PHEM) under the Health Bureau handles health emergencies using a multi-hazard approach focused on preparedness, early warning, response, and recovery.

7.1.3.2 Study period

The investigation was condicted from 29 August to 17 October 2023.

7.1.3.3 Study Design

Community based unmatched case-control design .

7.1.3.4 Definition and Case definition

Suspected Cholera case:

In areas without a declared cholera outbreak, anyone aged 2 or older with acute watery diarrhea and severe dehydration, or who dies from it, is considered a case. In declared outbreak areas, any person with or dying from acute watery diarrhea is classified as a case.a(1,16).

Confirmed cases:

A suspected case in which Vibrio cholerae O1 or O139 has been isolated in the stool(1,16).

7.1.3.5 Inclusion and exclusion criteria

Enrollment of Case

Field staff assessed the discharge and observation area of the cholera treatment unit (CTU) in Haramaya woreda to identify case-patients. Eligible participants were enrolled and interviewed by trained health professionals using a structured questionnaire. For patients under 15, parents or guardians were interviewed. Their residential locations from the previous 5 days were recorded to support household observations and control recruitment.

Enrollment of Control

Two healthy neighborhood controls were systematically selected for each case. Starting from the case-patient's home, one enumerator approached the second nearest house in one direction, while another went in the opposite direction. Field staff asked if any residents had diarrhea since August 28, 2023, excluding households with diarrhea cases after that date. Eligible households enrolled individuals as controls who lived there during the 5 days before the patient's symptom onset. If a control was unavailable, field staff revisited the home later. If they couldn't contact the individual after two visits, they replaced the potential control with another eligible neighbor.

7.1.3.6 Data Collection Techniques

A structured questionnaire was created following hypothesis-generating interviews and was used for both case-patients and controls. Although developed in English, enumerators administered it verbally in Haramaya woreda, having been trained for consistency. The questionnaire was pilot tested on 17 participants in Maya town. Case-patients reported exposures from the 5 days before illness onset, while controls reported exposures from the same period. GIS coordinates of homes and water sources were recorded using a GPS device on a mobile phone.

7.1.3.7 Study Variables

7.1.3.7.1 Dependent variable

Cholera status (case versus control)

7.1.3.7.2 Independent variables

Socio-demographic characteristics included age, sex, marital status, religion, ethnicity, occupation, income, education, and residence. The assessment covered water source exposure and treatment, food and beverage exposures in the 5 days before illness, access to sanitation,

latrine usage, handwashing practices, cholera knowledge and treatment, availability and use of ORS, free chlorine residual status, and vaccination status.

7.1.3.8 Operational definition

Confirmed case:- Is a suspected case where Vibrio cholerae*O1 or O139 has been isolated from the stool.

Epidemiologically linked case :Is a suspected case that has had contact with a laboratory-confirmed case or another linked case..

Case detection: Is a ways of identtifying cases and outbreaks

Case registration: is the process of recording the identified cases.

7.1.3.9 Data Quality Assurance

Before analysis, data was cleaned, checked for any missing and miscoded or wrongly entered data and recorrected it.

7.1.3.10 Data Analysis

Data were entered into an MS-Excel 2010 and later exported to Statistical Package for Social Science(SPSS), cleaned and analyzed.Food ,water source,occupation status specific attack rates (AR),Odds ratio(OR) and adjusted odds ratio(AORs) and 95% confidence intervals(95% CI) were calculated for the consumption of food and water items. The c2 test was used to compare proportions between groups. and Exposures of cases and controls were compared to yield crude odds ratios (CORs), adjusted odd ratio(AOR) and 95% confidence limits using bivariate, multivariate analysis respectively. Conditional logistic regression was performed to create a multivariate model that examined interactions and the impact of confounding variables.

7.1.3.11 Informed Consent

The Oromia Health Bureau authorized the local investigation and response to the outbreak. Verbal informed consent was obtained from participants, and personal identification information was not included in the report. Cases were referred to the CTC for medical care.

7.1.3.12 Dissemination Plan

This study report was submitted to Oromia Regional Health, Addis Ababa University School of Public Health Department of field epidemiology, East Hararghe Zonal Health Department and Haramaya woreda Health Office.

7.1.4 RESULT

7.1.4.1 DESCRIPTIVE FINDINGS

7.1.4.1.1 Description of cases by place

Out of 50 cholera cases were identified were reported almost in three weeks, between August,28-October 17/2023 from six kebeles, namely:Awumera,Awumera Qarsa ,Kersa Gatata,Gobile Qirixa,Qarsa Qajima,Waltaha Bilisuma. The majority of the cases 34(68 %) were from Awumera kebele as depicted in().

7.1.4.1.2.Cases description by time period

The outbreak started on 28 August 2023 reaching its peak at 29 August 2023 and continues up to 17 October, 2023 (Fig 3). A female 30 years old index case was notified on August 28, 2023 from Awumera Kebele, Rare village and seen at Awumera health center. She was admitted to Cholera treatment center (CTC) on same date. She drank on 25 August /2023 fecal contaminated water from unprotected natural spring around their home, which give service for that village, but she did not have history of contact with cholera suspected person and of travel to cholera affected areas five days before his onset of illness. She experienced acute watery diarrhea, vomiting and dehydration, with isolation of Vibrio cholerae from his stool sample. In addition, the water sample collected from where she drank wells water was found to be Vibrio cholerae positive. She was discharged on 7 October /2023 following his recovery.

The epidemic curve (Figure 3) indicated that the outbreak started on 28/8/2023 and rapidly increased on 29/8/ 2023 when 9 cases were reported. There were 5 peaks during the outbreak in the period under study (From 28 August to 17 October, 2023(Figure 35).

7.1.4.1.3 Cases description by person

Females were more attached with a maximum AR of 2.1/10,000, and those who were between the ages of 5-15 year was also more affected with AR of 3.3/10,000 and the cases were low in 16-30 years groups which was 0.7/10,000 attack rate(AR). The overall AR as total population was 1.9/10,000 during outbreak investigation(Table 34).

7.1.4.1.4 Characteristics of cases and controls

During the outbreak investigation, 50 cases and 100 controls were recruited and asked about various factors, including their knowledge of cholera transmission, prevention methods, age groups affected, vaccination status, and contact history, travel history, water source for drinking , health seeking behavior, occupational status and level of education. As we compared cases with controls by knowledge, attitude and practice, majority of both of them (90%) were received information about cholera by once a week and per two weeks ago.From those have heard about

cholera majority of the cases (48%) and 45% controls have got the information from health workers (HWs),28% cases and 15% of controls from family members(Figure 36). 82% of the cases and 91% of controls had known how to get cholera disease. Majorities of cases' 28 % were uneducated than control and from the total,56% of cases were students.When we conducted chlorine test of their drinking water at house hold level, majority of cases' drinking water (80%) negative for chlorine. But that of controls 84 % positive for chlorine. When we assessed the attitude and practice of cases and controls, from cases 35(70%) of them did used wells ,13(26%) spring,7(14%) drinking river water, while 24(24%) 0f control used wells,81(81%) spring,16(16%) river water for drinking purpose. The 76% and 80% of cases and controls respectively had used open defecation (didn't use latrine).Majority of cases (60%) and controls(74%) didn't practice hand washing with soap after toilet(Table 35).

7.1.4.2 Analytical Epidemiology

An unmatched study recruited 50 cases with median age of 12 and 100 controls with a median age of 14. Females made up 60% (n=30) of cases and 51% (n= 51) of controls. (Table 35) .

All cases experience waterly diarrhea 50 (100%), vomiting 43 (86%), and nausea 15 (30%) and no one developed leg cramps and abdominal pain. All of them visited health facility and admitted cholera treatment center (CTC)(Table 36), and there was 1 death. A higher percentage of case-patients were students, but univariate analysis did not show statistical significance. Laboratory tests confirmed that stool from one case-patient and water samples contained Vibrio cholerae O1 of the Ogawa serotype. On bivariate analysis for factors; chance of getting cholera was lesser in households with latrine (protective factors),0.792 [0.952-4.554] than compared with households with no latrine, however it was no statistically significant. Odds who had travelled history 0.49 less likely to had cholera than odds of non –ill/control/ who didn't travel. Also the like hoods of getting cholera were lesser among odds positively tested for chlorine 0.752[0.378-1.497],ate fruit 0.649[0.243-1.732], raw meat 0.552[0.175-1.740],use different methods to cleaning water 0.531[0.246-1.148],hand washing with soaps after toilet 0.527[0.256-1.084],drank wells water 0.135[0.063-2.89] than odds negatively tested for chlorine, didn't eat fruit, raw meat, didn't use different methods to clean water, didn't wash hand with soap after toilet, didn't drink wells water and didn't eat unheated/raw vegetables respectively .However, except Wells water(0.135[0.063-2.89],P-value<0.001) and raw vegetables 0.74[0.030-0.184] P-value <0.001),none of them statistically didn't significant. Reversely, odds getting cholera was

about 1.17 higher people exposed to drank river water than non-exposed, about 12 higher people exposed to drank spring water than non-exposed,2 times higher among un vaccinated than vaccinated, about 1.6 higher in male than female, about 1.1 in age ≥ 30 years old than age < 30 years old ,1.222 times among students and 1.537 times higher in primary school . But only spring water was statistically associated (P-value <0.001).

In multivariable analysis, drinking spring water (AOR:16.02, 95 % CI, 6.01-30.06), eating raw vegetables(AOR: 2.4, 95% CI, 2.1-6.08) were pinpointed as associated independent risk factors. Whereas washing hand with soap after toilet (AOR:0.443,95% CI,0.15- 1.308] , knowledge ways of cholera prevention (AOR:**0.211,[95%CI,0.054-0.835]** were independent protective factor (Table 37).

Public health Intervention/Response/undertaken

During the outbreak investigation, a multi-team effort collected logistics, drugs, and materials for interventions, including doxycycline, fluids, chlorine, soap, ORS, Berakina, and potable water for the woreda. They distributed 17,588 Aquatabs and 15,321 Bishan gari, and constructed 1,711 new latrines. The team conducted house to house active case searches and treated cases with ORS to prevent dehydration before reaching the cholera treatment center (CTC). A routine surveillance system was initiated, and health education was provided to community members, local leaders, and health workers. All suspected contaminated water sources were closed, and treatment was performed. Suspected cholera cases were referred to nearby health facilities while resources were mobilized for health facilities. Ongoing monitoring and evaluation were recommended for the zonal health department and woreda health office.

Laboratory result

Two stool samples were collected from patients on August 28, 2023, both testing positive for Vibrio cholerae serogroup O1, serotype Ogawa. Of 14 water samples tested from sources in Haramaya woreda, all (100%) were positive for fecal coliform, and 12 (86%) posed a high to very high risk of causing disease.

Chemical Test

12 Free residual chlorine test had been done and only 2 (14%) had detectable free chlorine concentration, while the remaining 12(86%) had no free residual chlorine.

Physical Test

A total of 16 from haramaya woreda turbidity test had been conducted of which 6 (22%) is > 20 NTU(Nephelometric Turbidity).

7.1.5 DISCUSSION

7.1.5.1 Water source Exposures

Cholera remains a significant public health issue, particularly for vulnerable groups living in resource-limited environments with poor access to clean water and proper hygiene practices (2). The cholera outbreak indicated that waterborne transmission was linked to drinking contaminated river and spring water. Protective factors included handwashing after using the toilet, latrine use, various water treatment methods, and chlorine, demonstrating the importance of hygiene in cholera control.

In bivariate analysis,our result revealed that drinking river and unprotected spring water drinks increased the risk of cholera. However, multivariate analysis showed that, drinking unprotected natural spring water the increased dramatically the risk of getting cholera infection and a statistically significant risk factor,and this findings similar with cholera investigation done in oromia region(3)(Table 37,Table 38). Majorities of cases and controls hadn't access to improved water sourceshad no potable water source, unprotected natural spring water source which serviced for large proportions of public and it is not suitable for treatment at source site. And tangibly seen was there was very low improved water source within Haramaya woreda. The woreda has faced significant population growth. Overcrowding, and limited resources, leading to poor hygiene and sanitation. These factors, along with low access to improved water sources, open defecation, and low chlorination rates, increase vulnerability to cholera. Point-of-use water treatment is the most effective short-term solution for safe drinking water. Investigations found that 20% of case households and 78% of control households had water treatment products, but only 18% had detectable chlorine residuals in stored drinking water—47% for both cases and controls. This finding suggests that either social practice is low and shortage or lack of chlorine could make this. Even though the aim of our investigation was not ascertain whether the participants had the required supplies or knowledge to prepare food and drinks hygienically, this is a topic that needs additional investigation.

7.1.5.2 Food exposures

Although fresh vegetables typically include naturally occurring, non-pathogenic epiphytic bacteria, they can become infected with cause disease or pathogens for both human and animal

sources during cultivation, harvesting, transportation, and other handling processes. From the farm to the consumer's mouth, raw vegetables able to become contaminated by vibro cholerae at any stage of the manufacturing process(16). The bacteria can survive 2-5 days on contaminates surfaces. The investigation tested various food items for their association with cholera infection risk. Findings indicated that consuming raw or unheated vegetables was a risk factor, which aligns with research conducted in Addis Ababa(17). Cooking raw vegetables for at least 10 minutes will kill V.cholerae and safe handling practices can prevent cross-contamination, ensuring the food is safe to eat.

7.1.5.3 Socio-demographic factors

The case and control groups were comparable with respect to age category. In our analysis females made up 62 % of all reported cases. In addition, 27 percent of the reported cases were aged 5 to 15 years, it was the highest proportion when compared to other age and gender groups respectively.However,in bivariate analysis male about 1.6 times higher chance of getting cholera infection female and 1.1 times higher above ≥ 30 years old than < 30 years old. When we came to the occupation status of cholera cases, students and farmers account for the majority, accounting for 28(56%) and 13(26%) respectively, these also agreed with students were 1.2 times higher like hoods of getting cholera infection than not being student but being farmer, houses wife and child (no work) were protective by bivariate analysing.It could be because of differences in exposure and risk among different genders and occupational categories. Males in their productive years are more likely to spend time away from home and are more likely to be exposed to contaminated food and water. Students are at a higher risk of contracting with each other at school sites and chance of meets with suspected case of cholera is high. Also we had seen with level of education. Majorities of cases' were uneducated than control, with 28% vs.0%, respectively. While not statistically significant, this finding aligns well with the higher proportion of controls reporting 'student' as their occupation. Level of education may impact understanding of health messages. Finding was similar with findings from studies in Ethiopia's Oromia region(3),Uganda(18) and Niger(19). According to the findings from the aforementioned areas, males , people aged 5-15 and above, were more affected than female.

7.1.5.4 Levels of Knowledge, attitudes and practice factors

We also incorporated to see levels knowledge, attitudes and practices (KAP) into the case-control study. While the results of this findings were only applicable to the study population in

Haramaya woreda, this area was the most affected by the epidemic. To assess community knowledge, we went through several steps. First, a 95 % of study population had heard cholera on the 6 topics of cholera messaging. The most common source of information was the health workers, with family members &friends and community members. These findings suggest that people were gathering different information and talking with each other about the messages, expanding the reach of the social mobilization campaign. Sanitation and hygiene, Hand washing, the importance of drinking treated water, and immediately seeking health care when diarrhea develops also appeared to be well retained messages. Moreover, when we cross-checked with by bivariate analyzed, hand washing and knowledge on ways of cholera prevention, were protective factors 0.331[0.029-3.840] and 0.211[0.054-0.835] respectively. This may suggested result of health education. Given that health messaging had only been disseminated for a few weeks before our study, these findings indicate that knowledge and preventive messages were reaching the community.

Study participants didn't understand the importance of soap in preventing cholera and we found that soap wasn't universally available. Also the major gaps existed between the knowledge of ORS and water treatment products and the possession of these items. WASH interventions focused on improving the practice of point-of-use water treatment and ORS use might help to increase the availability of these prevention and treatment products.

7.1.6 Limitations

This study was also limited with the several limitations including late notification of the outbreak which could be attributed to poor coordination of different stakeholders made delayed initiation of response. Nevertheless, response started at almost by the 1st of the September 2016 though not timely but mitigated the outbreak.

Health care workers strike action delayed the laboratory culture investigation and contributed to the failure to isolate V. cholera from the water samples. Lastly, we could not entirely rule out the possibility of misclassification of cases as controls since most cholera cases are asymptomatic. However, we tried to minimize this selection bias by recruiting our controls from every two households to the right of the household of the cases where no member had no signs and symptoms of diarrheal disease within the study period. Only recent cases were recruited for the study. Furthermore, confounders such as socioeconomic status and differences in age groups in the unmatched case control study could have influenced the association found.

Despite these limitations, the study provided useful information to stakeholders on actions that will avert future outbreaks by provision of basic water, sanitation and hygiene infrastructures such as functional boreholes and standard pit latrines. Community risk communication and surveillance strategies need significant improvements to ensure prevention of adverse effects of diarrheal diseases in general and cholera in specific.

7.1.7 Conclusion & Recommendation

Vibrio cholerae was the cause of the outbreak in Haramaya. Drinking water from unprotected natural spring and wells water, didn't use chlorine, lack of knowledge on ways of prevention and consumption of raw vegetables were significantly associated with cholera outbreak. Health education has to tobe needed to empower community, treat water source and avail protected potable water. Plus to consumption of cooked vegetables.

What is all about the topics?

- Cholera is an infectious disease endemic in many regions of Ethiopia, including Haramaya
- Prompt detection and confirmation of cholera outbreaks enable a swift response, reducing the outbreak's impact on the population.
- Independent risk factors for cholera include drinking of unprotected spring water and didn't use chlorine, lack of knowledge on ways of prevention and consumption of raw vegetables.

What this investigation adds

We found that community of Haramaya woreda drank of unprotected natural spring water and consumption of raw vegetables, lack of knowledge on ways of prevention were independent risk factors for cholera outbreak in Haramaya Woreda.

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7.1.9 DECLARATION

A**vailability of Data and Materials**:The datasets used and analyzed during this study are available from the author upon reasonable request.

Competing Interests:The authors declare that there are no competing interests.

Funding Statement:There was no role of funders in the study's design, data collection, analysis, interpretation, or manuscript writing.

Authors' Contributions:Yohanis Tesfaye Ayana conceptualized and designed the study. All authors were involved in monitoring data collection, analysis, and interpretation, providing suggestions and comments throughout the process, and contributing to manuscript preparation.

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Table 34:Distribution of cholera case by Person Haramaya Woreda,East Hararghe Zone from August 28 -October 17 /2023.

Category	At risk population	Number of cases	AR/10,000	CFR (%)
Sex				
Male	129,792	19	1.5	5
Female	137,766	31	2.1	3
Total	267,558	50	3.6	4
Age Category				
2-4 years	42809	6	1.4	
5-15 years	82,943	27	3.3	

16-30years	74,916	5	0.7	
31-45 years	34,783	7	2.0	
> 45 years	29,431	5	1.7	
Total	267,558	50	1.9	

Table 35:Demographic characteristics of cholera cases andcontrols,Haramaya,woreda,East Hararghe, Oromia,Ethiopia: August 28-October 17/2023.(Univariate Analysis)

Socio-demographic characteristics variables	Category	Cases(N=50)		Control(N=100)	
		Number	%	Number	%
Age(years) without category	Mean	18.60		19.60	
	Median	12		14	
	Mode	8		14	
	Range	2-60		2-60	
	SD	16.42		14.90	
Age (years)	2–4	6	12.0	11	11.0
	5–15	27	54.0	52	52.0
	16–30	5	10.0	12	12.0
	31–45	7	14.0	14	14.0
	Above 45	5	10.0	11	11.0
SEX	Male	19	38	49	49
	Female	31	62	51	51

Educational Status	primary school	20	40	86	86
	secondary school	14	28	6	6
	college or above	2	4	0	0
	Never go school	14	28	8	8
Occupation	Student	28	56	24	24
	Farmer	13	26	24	24
	house wife	2	4	34	34
	Child	7	14	18	18

Table 36:Frequency of clinical signs and symptoms for cholera case patients,Haramaya, 2023

Sign & Symptoms	No.of cases(%)
Water Diarrhea	50(100)
Vomiting	43(86)
Nausea	15(30)
leg pain	0(0)
Abdominal pain	10(20)
Chills	5(10)
Fatique	17(34)

Table 37:Bivariable analysis for comparing exposures characteristics of cholera outbreak among cases and controls,Haramaya woreda,East Hararghe,Oromia,from August 28 October 17, 2023.

Exposures	Control(%)	Case(%)	COR(95%CI)	P-Value

Travel history	No		98(98)	48(96)	1	
	Yes		2(2)	2(4)	0.490[0.067-3.584]	0.482
Water sources exposures	River	No	84(84)	43(86)	1	
		Yes	16(16)	7(14)	1.17[0.447-3.060]	0.749
	Spring	No	19(19)	37(74)	1	
		Yes	81(81)	13(26)	12.134[5.422-27.154	0.000***
	Well	No	76(76)	15(30)	1	
		Yes	24(24)	35(70)	0.135[0.063-2.89]	0.000***
Test chlorine in drinking water during observation	Negative		53(53)	30(60)	1	
	Positive		47(47)	20(40)	0.752[0.378-1.497]	0.417
Food exposures	Raw or un heated vegetable	No	92(92)	23(23)	1	
		Yes	8(8)	27(27)	0.74[0.030-0.184]	0.000***
	Fruits	No	89(89)	42(84)	1	
		Yes	11(11)	8(16)	0.649[0.243-1.732]	0.388
	Raw meat	No	93(93)	44(88)		
		Yes	7(7)	6(12)	0.552[0.175-1.740]	0.552
Latrines usage	No		80(80)	38(76)	1	
	Yes		20(20)	12(24)	0.792[0.351-1.785]	0.573
Vaccination status	Unknown		1(1)	1(2)	1	
	No		89(89)	42(84)	2.119[0.129-34.707]	0.599
	Yes		10(10)	7(14)	1.429[0.076-26.895]	0.812

Age groups	2-30 Years		75(75)	38(76)	1	0.893
	>30years & above		25(25)	12(24)	1.056[0.478-2.329]	
Sex	Female		51(51)	31(62)	1	
	Male		49(49)	19(38)	1.568[0.784-3.134]	0.203**
Different methods for cleaning water	No		80(80)	34(68)	1	
	Yes		20(20)	16(32)	0.531[0.246-1.148]	0.107**
Washing hand with soap after toilet	No		74(74)	30(60)	1	
	Yes		26(26)	20(20)	0.527[0.256-1.084]	0.082**
Knowledge ways of cholera prevention	No		91(91)	41(82)	1	
	Yes		9(9)	9(18)	0.451[0.167-1.218	0.116**
Level of education	Primary school	No	14(14)	10(10)	1	
		Yes	86(86)	40(40)	1.537[0.628-3.755]	0.347
	Secondary school & above	No	77(77)	17(34)	1	
		Yes	33(33)	33(66)	0.154[0.073-0.325]	0.000***
Occupational status	Student	No	45(45)	25(25)	1	
		Yes	55(55)	25(25)	1.222[0.619-2.413]	0.563
	Farmer	No	76(76)	25(25)	1	
		Yes	24(24)	25(25)	0.316[0.154-0.649]	0.002***
		Yes	4(4)	34(68)	0.020[0.006-0.063]	
	House	No	96(96)	31(62)	1	

	wife	Yes	4(4)	19(38)	0.068[0.021-0.715]	0.818**

95% Confidence interval, *** has significantly associated variables and ** candidate variable

Table 38:Multivariable analysis for comparing exposures characteristics of cholera outbreak among cases and controls,Haramaya woreda,East Hararghe ,Oromia, August 28-October 17,2023.

Exposures			Control (%)	Case (%)	COR(95%CI)	AOR(95%CI)	P-Value
Water sources exposures	spring	No	19(19)	37(74)	1	1	0.005***
		Yes	81(81)	13(26)	12.134[5.422-27.154	164.18[4.746-5679.58]	
Food exposures	Raw Vegetables	No	92(92)	23(23)	1	1	0.009***
		Yes	8(8)	27(27)	**1.9 [1.6-3.5]**	**2.4 [2.1-6.80]**	
Knowledge ways of cholera prevention	No		91(91)	41(82)	1	1	0.027***
	Yes		9(9)	9(18)	0.451[0.167-1.218	0.211[0.054-0.835]	
Different methods for cleaning water	No		80(80)	34(68)	1	1	0.852
	Yes		20(20)	16(32)	0.531[0.246-1.148]	0.626[0.005-85.34]	
Sex	Female		51(51)	31(62)	1	1	0.574
	Male		49(49)	19(38)	1.568[0.784-3.134]	0.493[0.042-5.819]	
Washing handwithsoap after toilet	No		74(74)	30(60)	1	1	0.377
	Yes		26(26)	20(20)	0.527[0.256-1.084]	0.331[0.029-3.840]	
	Farmer	No	76(76)	25(25)			

Occupationastatus		Yes	24(24)	25(25)	0.316[0.154-0.649]	0.458[0.002-2.86]	0.775
	House wife	No	96(96)	31(62)	1	1	0.681
		Yes	4(4)	19(38)	0.068[0.021-0.215]	0.081[0.001-0.86]	
Levelof Education	Secondary school &above	No	77(77)	17(34)	1	1	0.389
		Yes	33(33)	33(66)	0.154[0.073-0.325]	3.687[0.189-71.764]	
95% CI, *** has significantly associated variables.NB:All variables with p≤ 0.25 in bivariate analysis were included in multivariate logistic regression analysis							

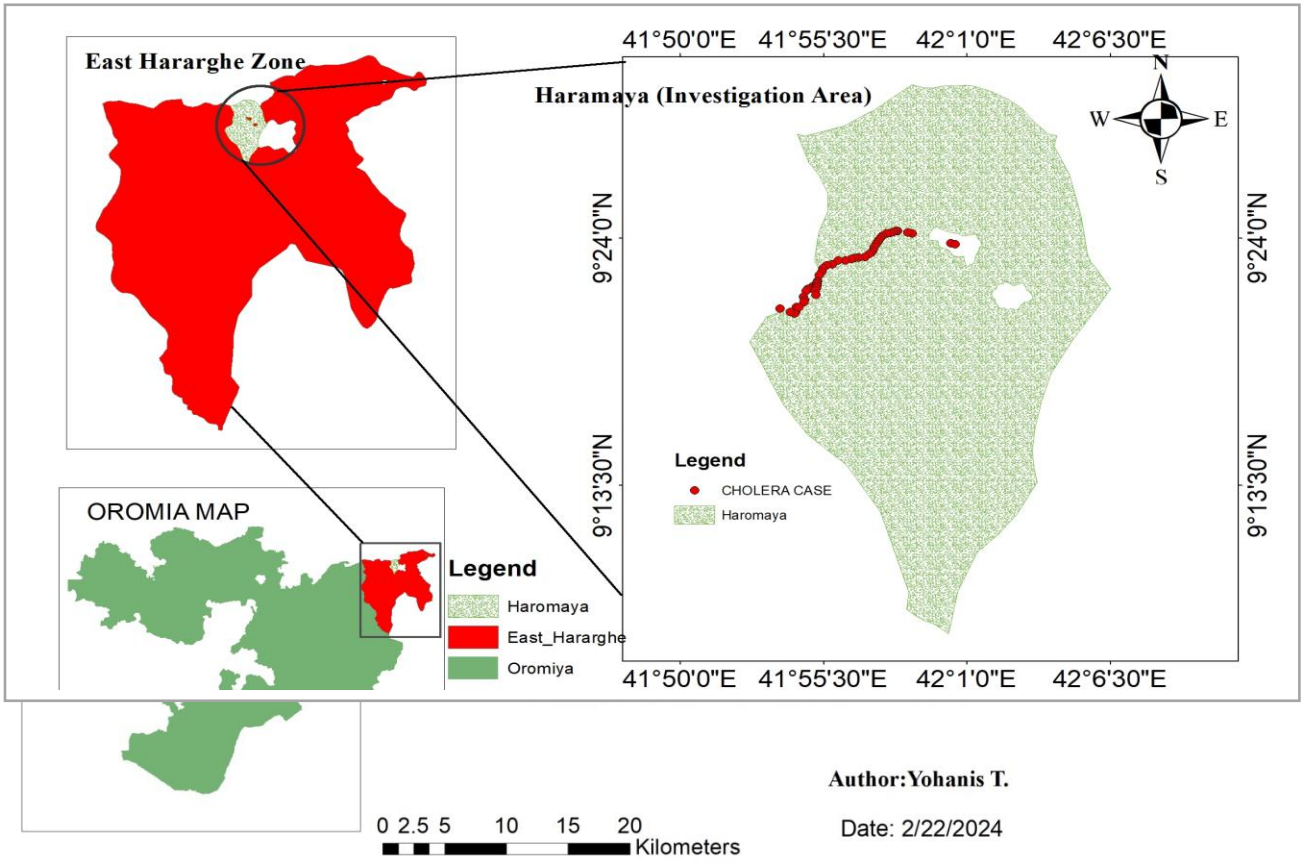

Figure 33:Map of Cholera Investigation Area

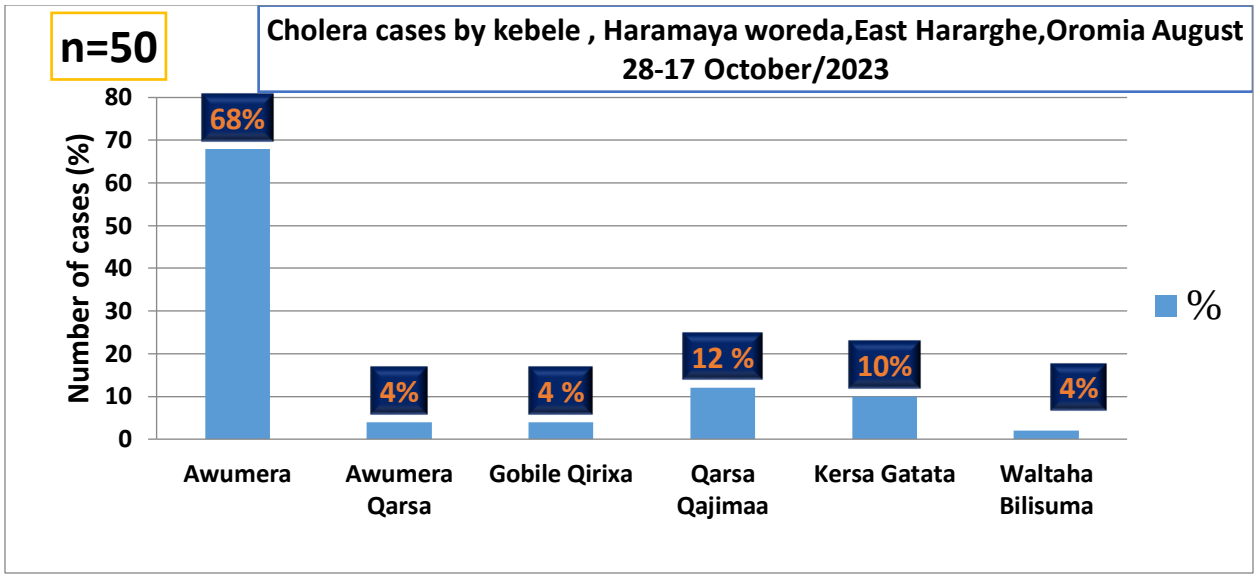

Figure 34:Distribution of cholera case by place in Haramaya Woreda

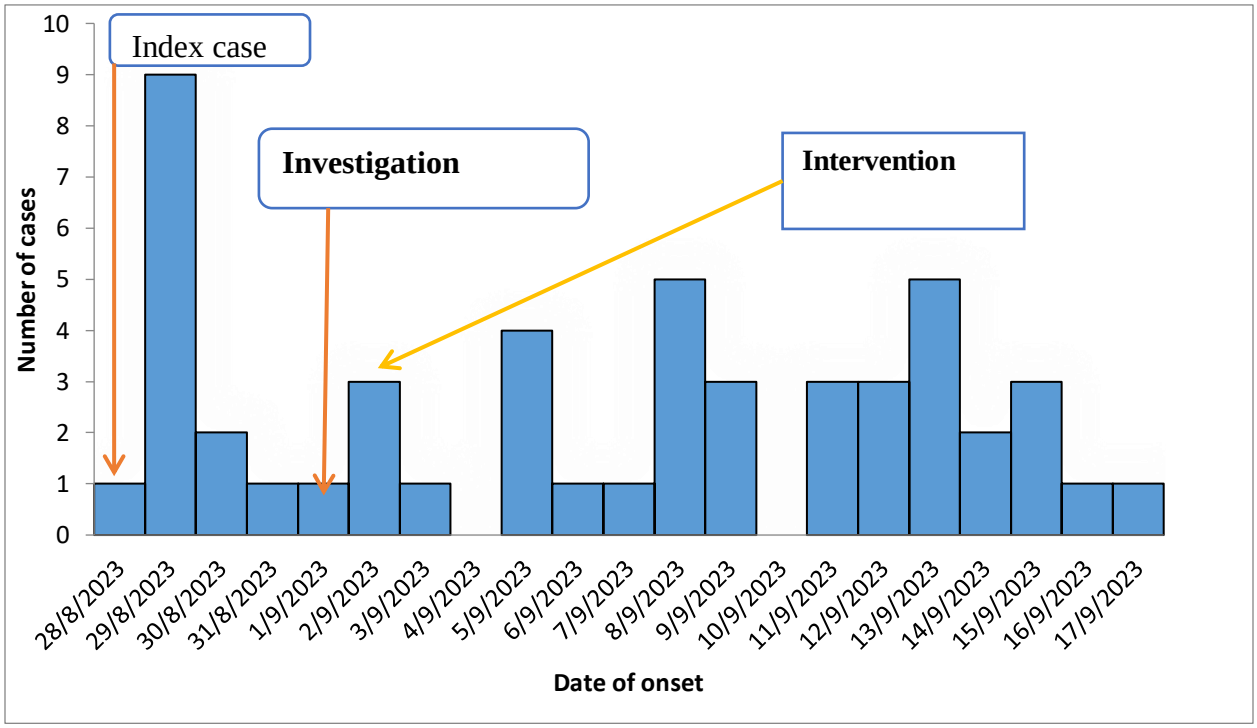

Figure 35:Cholera cases by date of onset: From 28 August to 17 October, 2023,Haramaya Woreda, East Hararghe,Oromia,Ethiopia

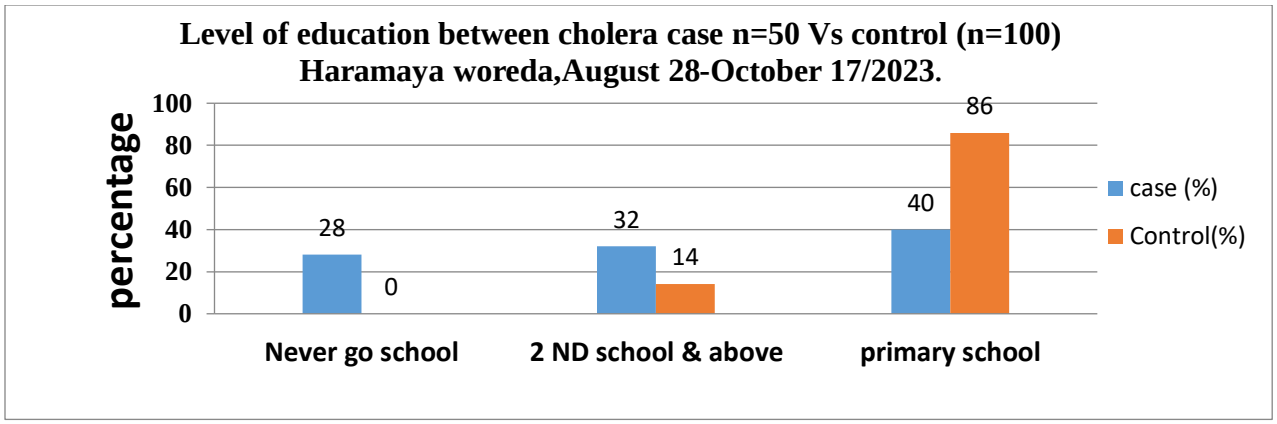

Figure 36:Levels of education between Cases and controls at Haramaya woreda,East Hararghe Zone from August 28-October 17,2023

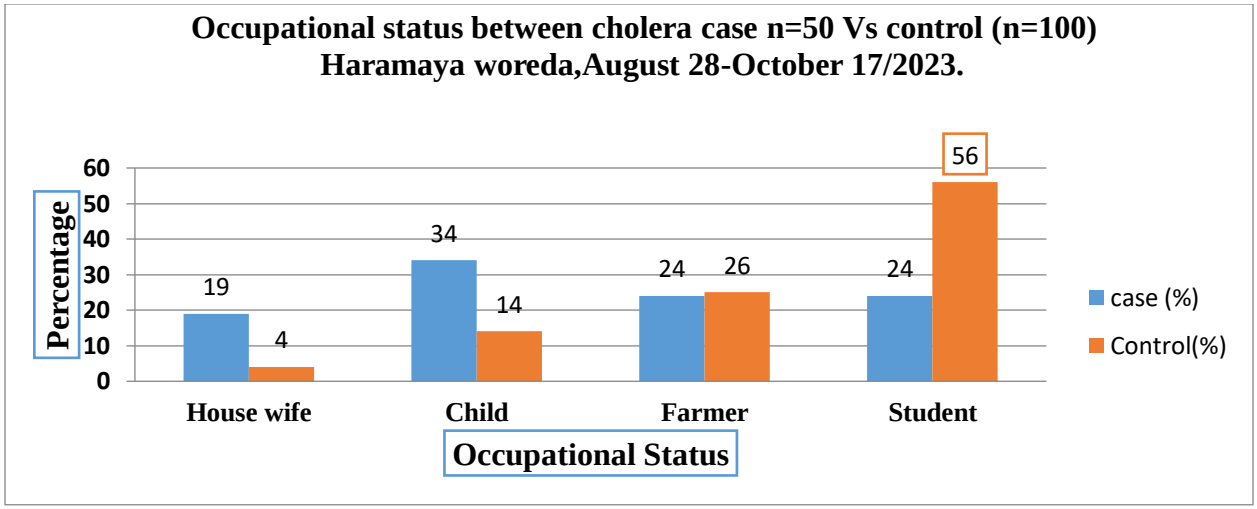

Figure 37:Occupational status between Cases and controls at Haramaya Woreda,East Hararghe Zone from August 28-October 17,2023

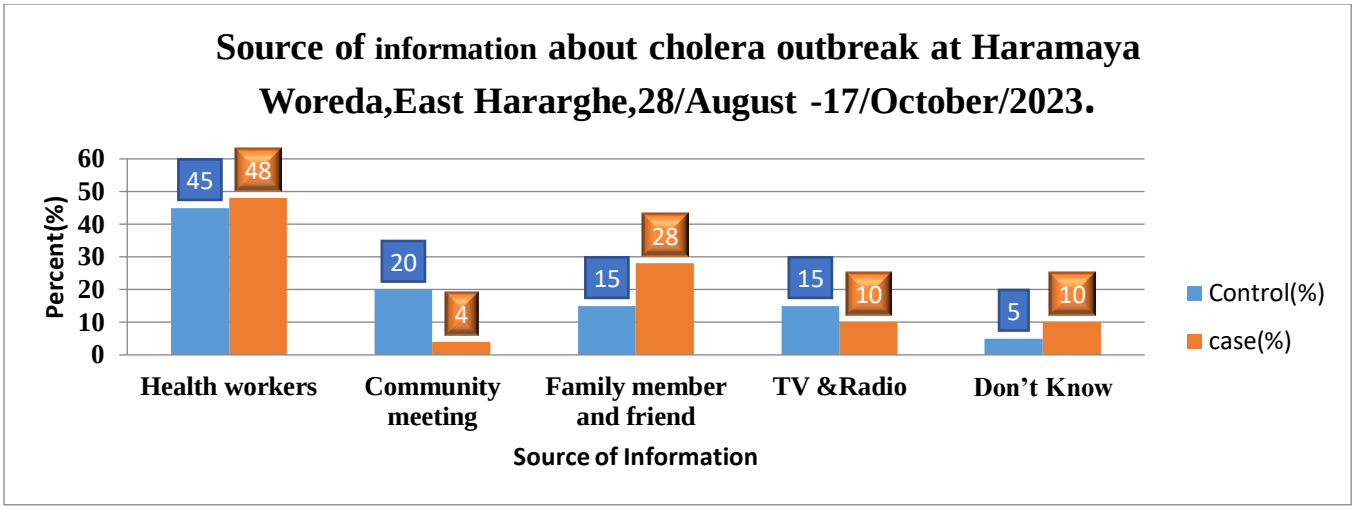

Figure 38:: Source of information about cholera oubbeak at Haramaya woreda,East Hararghe Zone from August 28 to October/17,2023

7.2 Evaluation of the Hypertension Surveillance System, Sheger city, Oromia, Ethiopia, October, 2023: Mixed Quantitative and Qualitative Study

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Abstract

Background: Hypertension (HTN) is a significant risk factor for cardiovascular disease and a global health concern, affecting around 1.13 billion adults and causing 7.5 million deaths in 2021, with two-thirds of cases in low- and middle-income countries. Despite the high prevalence of hypertension in Sheger city, its surveillance systems have not been evaluated. Thus, we assessed the performance and key attributes of hypertension surveillance systems in Sheger city.

Methods: From August to September 2023, we conducted a mixed quantitative and qualitative study at 12 health facilities and 12 health office units in Sheger city. The qualitative component included 34 purposively selected key informants. Data were collected using updated guidelines for evaluating surveillance systems based on the CDC's framework.

Results: Records from 24 study units were reviewed, and 34 key informants participated. Surveillance data flowed from health facilities to the respective upper levels, with emergency preparedness and response plans available only at the district level. The overall completeness and timeliness of monthly reports at health facilities were 74% and 66%, respectively. We identified weak supportive supervision and feedback, with no regular analysis or interpretation of surveillance data. Stakeholder participation in the system's implementation was poor. The surveillance system was easy to implement but not representative and struggled to adapt to changing conditions. Reporting documentation and data quality at lower-level facilities were inadequate. The system's stability was challenged by budget shortages, logistical issues, staff turnover, and a lack of updated training

.**Conclusion:** The surveillance system used was simple.The quality of the data, the timeliness, completeness, usefulness, acceptability, flexibillity, and representativeness and the stability of the system were attributes that required improvement. The overall performance of hypertension surveillance systems was weak. Hence, increasing the acceptability, usefulness of the system, regularity of the analysis of the data, preparation, and dissemination of epidemiological bulletins, capacity building, and regular supervision and feedback are recommended to enhance the performance of the system.

Keywords: surveillance, system, evaluation, hypertension, Sheger city

7.2.1 Introduction

7.2.1.1 Background

Hypertension (HTN) is a significant risk factor for cardiovascular disease and a global health concern affecting around 1.13 billion adults (1), and causing 7.5 million deaths in 2021, with two- thirds of cases in low-and middle-income countries.(2,3).As estimated one-third(1/3) of adults worldwide will have hypertension by 2025, that number is anticipated to increase by 29% to 1.56 billion, with more than 125 million people living in sub-saharan Africa(4). As WHO statated African region has highest prevalence of hypertension(27%) in the world(6). In Ethiopia NCD including hypertension the leading cause death(711deaths per 100,00 population per year and hypertension accounts 62.3% of CVDs and affecting 20% of adult population(7)(4,8).Transitions in epidemiology, demographics, socioeconomics, and nutrition have all contributed to these increasing trends(13).

Despite growing concerns about non-communicable diseases (NCDs) in Ethiopia, there is no comprehensive national reporting, particularly for hypertension. A review from 1990 to 2021 found that the incidence of cardiovascular diseases ranged from 7.2% to 24%..However, since this assessment was completed more than ten years ago, and given Ethiopia's social and economic transformations, we anticipate a significant change in the prevalence of NCDs in the intervening years.

By 2013, African Union stated that NCD evaluation of NCD survelliance system is critical for monitoring and evaluating illness patterns and trends, which is necessary for better NCD prevention and management(14). However, no country met all the suggested key performance indicators (KPIs) for integrating NCD services into primary healthcare. Only about 30% of countries had officially approved guidelines for NCD management, while even fewer had all essential NCD drugs (13%) and technology (11%) available in primary healthcare facilities, including Ethiopia(15).

Fedral Ministry of Health Ethiopia (FMOH-E) produced the second version of the National Strategic Plan for the Prevention and control of NCDs (2020/21-2024/25) to curb public health challenges caused by major non-communicable diseases(16). Furthermore, the evaluation considered was primarily concerned with the hypertension surveillance system observed health-care settings in Shegercity,Oromia.

7.2.1.2 Significance of the Study

Ensures that hypertension trends and patterns were accurately tracked, facilitating timely public health responses. And also provides essential data for policymakers to make informed decisions regarding resource allocation and health interventions. Additionally, assessed the quality and

effectiveness of existing surveillance systems, leading to necessary improvements in data collection and reporting Moreover helps in the efficient use of resources by identifying gaps in the current system and areas needing support. Further more it increases awareness of hypertension as a public health issue, promoting community engagement and education.

.7.2.2 Objective

7.2.2.1 General Objectives

To assess the survelliance system for hypertension disease and assess key attributes of the surveillance system in Sheger city, Oromia,Ethiopia from August to September 30, 2023.

7.2.2.2.Specific objective

To describe the hypertension reporting system, usefulness, and public health importance.

To study the quantitative attributes of the hypertension reporting system.

The study qualitative attributes of the hypertension reporting system were studied.

7.2.3 Methods

7.2.3.1 Study Setting

Sheger city, the mayor for the new city administration, is situated about 25km north of Addis Ababa. Sebata, Burayu, Gafarsaguje, Malkanono, Koyefache, Kuradida, Furi, Legatafolegedadi, Sululta, ManaAbichu and Gelan towns, are the 12 subcities that surround Addis Ababa from all directions; these regions are now clustered as a single city under a single mayoral administration and cover an area of 160,892.8 hectares. The regions lies between latitude 8.91971 and longitude 38.76301,with average annual rain fall 1165mm and.The administration is already operational, Since the special zone was established after the 2007 census, accurate population data is difficult to obtain. According to the 2007 census conducted by the CSA, the estimated population size is 794,489, with 228,420 individuals (28.75%) identified as urban dwellers.. However, the total population of the Sheger city health department was 2,873,093; 48% (1,379,629) were males, and 45%(1,306,242) were females.

There are twelve (12) woreda health offices, twenty five(25) health centers,1 primary hospital, many health posts and private health facilities in the district provide primary healthcare services to the community, including public health emergency management. At the district level, the surveillance activities are coordinated by a PHEM officer who is responsible for organizing the implementation of surveillance activities in the health facilities under the district catchment. Similarly, there are PHEM focal persons assigned at health centers for organizing surveillance activities, preparing, and submitting of weekly reports to the district health office. This study covered different types of health facilities including health centers, health offices, and primary hospitals. For this study, (12 woreda Health Bureau, 11 Hcs and 1 primary hospital) were

approached and studied. At each woreda health office, surveillance activities are coordinated by a PHEM officer, who organizes these activities in health facilities within the district. Additionally, PHEM focal persons at all health centers are responsible for organizing surveillance activities and preparing weekly reports for the district health office and relevant authorities.

7.2.3.2 Study Design and Period

Mixed study approach of both quantitative and qualitative methods from August to September 2023.A cross-sectional study was carried out to determine the performance of a an HTN surveillance system in the district. The qualitative interview was carried out with the PHEM focal point of the district health office and health facilities.

7.2.3.3 Sample size and sampling procedure

A total of 24 study units/sites were included in the study. All the district health offices and one hospital were conveniently selected, and out of 25 health centers in the district, 11 (44%) were selected using the lottery method . A total of 12 health offices, 1 primary hospital and 11 health centers were included in the study. For the qualitative interviews, a purposive sampling technique was employed to select the key informants. The key informants were the district PHEM officer ,the 12 district PHEM officer, the 12 health centers PHEM focal person and 10 other health workers. As a result, 34 key informants were involved in the study and the most senior assigned adult OPD health workers were interviewed to determine whether they were a rich source of information.

7.2.3.4 Data collection tools and techniques

This study evaluated the hypertension surveillance system using the CDC framework, an updated guideline for evaluating public health surveillance systems(17). A semi-structured questionnaire was developed using the checklist for evaluating public health surveillance systems(17). The data were collected through record reviews, document observation, and face-to-face interviews with key stakeholders. For the quantitative survey, the sources of the data were surveillance reporting formats, records, and documents in the district health office and health facilities. For the qualitative study, key informants such as district PHEM officers, health centers PHEM focal personnel, and adult OPD assigned health workers were interviewed using a semistructured interview guide with a flexible probing technique. The data regarding the availability of surveillance guidelines, reporting formats and documentation, registration of cases, completeness and timeliness of the reports, and quality were assessed via quantitative survey by examining the report format, records, and documents. Key informants explored information concerning the operation of the surveillance and reporting system; case detection, and attributes such as

simplicity, flexibility, predictive value positive, representativeness, and stability of the system. Information concerning the analysis and interpretation of surveillance data, epidemic preparedness and management, outbreak investigation, supportive supervision and feedback, and the acceptability of the surveillance system were assessed both by document observation and key informants. The data were collected by principal investigator. The Interviews were continued until saturation was reached, meaning that the investigator agreed that there was redundancy in the responses and that no new ideas emerged.

7.2.3.5 Data Quality Assurance

A week later, the questionnaires were reviewed and the meanings of each word, question and sentence were discussed with senior field epidemiologists and field mentors.The reports and records obtained from the health facilities were cross-checked against the documented data at the district health office to check the consistency and accuracy of the data. During the session of each visit, briefed information was given to the stakeholders about the purpose of the assessment, which was to evaluate the performance of the system rather than individual performances. Prior to the data collection stakeholders from the Sheger city health department, district health office, and health facility were discussed to ensure that the evaluation of the system addresses appropriate questions and attributes; and to produce useful and acceptable findings.

7.2.3.6 Data processing and analysis

The quantitative data were entered and analyzed using Microsoft Excel 2010. All questionnaire responses were dichotomized except for the open-ended questions. The quantitative findings were summarized by their frequency and proportion. Qualitative data were analyzed manually via thematic analysis. The data were cleaned before analysis and the qualitative findings were narrated and summarized based on thematic areas to supplement the quantitative results. Responses to each question were categorized into five groups: Strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1). The average score for each question item and attribute was then calculated.

7.2.3.7 Ethical clearance

This study aimed to assess the functionality of the hypertension surveillance system, focusing on health institutions in Sheger city. Ethical clearance was not required since there was no direct contact with patients or the community. However, consent was obtained from the Oromia Regional Health Bureau, the Sheger city health department, and the woreda health office to visit health facilities and engage with health workers.

7.2.3.8 Dissemination of study results

The study results were shared with the AAU School of Public Health, the Ethiopia Field Epidemiology Training Program (EFETP), EPHI, the Regional Health Bureau, and visited woreda health offices in both hard and soft copies.

7.2.3.9 Operational definitions

Case definition of hypertension

Systolic blood pressure measured on two different days was ≥140 mmHg, and/or diastolic blood pressure on both days was ≥90 mmHg(18) .

Simplicity

The study assessed how easily healthcare workers identified hypertensive cases and whether any steps or procedures caused delays in action or hindered the system's smooth functioning. This included evaluating the case definition of hypertension, reporting formats, the time required to collect data from individuals, and awareness of the hypertension surveillance system flow(17).

Flexibility

The system's ability to adapt to changing information needs or operating conditions with minimal additional time, personnel, or funding(17). In this study, the flexibility of the surveillance system was evaluated based on its ability to accommodate changes in existing procedures, revised case definitions, additional data sources, personnel, case detection, and reporting formats.

Stability

This refers to challenges impacting the system's consistent functioning, including inadequate reporting tools, personnel issues, DHIS2 software problems, internet connectivity, and staff availability(17).

Usefulness

A public health surveillance system is useful if it aids in preventing and controlling health-related events, enhances understanding of their implications, and meets objectives for monitoring hypertension trends to inform public health decisions and actions.(17).The usefulness was assessed based on actions taken from data analysis and interpretation, with the system proving effective in detecting diseases and outbreaks and estimating morbidity and mortality levels..

Acceptability

The willingness of stakeholders to implement the surveillance system was shown through their active participation in case detection and reporting. Acceptability was assessed based on the completeness of report forms, data reporting timeliness, and adherence to standard case definitions(17).

Timeliness

The timeliness of the reporting was assessed at two levels. First, it was calculated by assessing how many of its expected reports were submitted to the next level within the prescribed time. A report is timely for health facilities if a monthly report is submitted to the district health office every 21-23 day, and a timely report for the district is if the district health office submitted the compiled report to the zonal health department every 24-30 day(17).

Completeness

The proportion of health facilities that submitted a monthly report to higher level, out of the expected facilities in the catchment area (district, PHCU, kebele).

Data quality

The data quality was assessed based on the completeness of the reporting formats and the validity of the data recorded.The fields examined for completeness included the number of cases and deaths, the date the report was sent and received, and the blank responses. Validity of the recorded data at health facilities compared to the reported data at the district level. The full variable of age, sex, weight, smoking status, physical activity, and lipid profile was recorded(17).

Sensitivity

The proportion of patients detected by the DHIS2 system versus the number registered per health facility register was determined.

Representativeness

The data were measured in terms of the distribution of a health-related event by time, place, and person; health service coverage; and the reporting of surveillance data from all health facilities.

7.2.4 Results

7.2.4.1 Characteristics respondents

Of the 34 health workers interviewed, 58.8% (20 of 34) were state-enrolled as public health officers, 29.4% (10 of 34) were nurses and 11.8% (4 of 34) were public health staff. Among those with the highest level of education, 61.8% (21 of 34) had a degree, while 38.2% (13 of 34) had a master's degree. The median age of the respondents was 29 years (range 25-36 years), and 70.6% (24 of 34) were men. Of the health workers, 83.4% (28 of 34) had more than 5 years, 14.7% (5 of 34) had 3 to 5 years, and 2.9% (1 of 34) had 2 to 3 years of experience.

7.2.4.2 Surveillance operation

7.2.4.2.1 Communication and reporting system

The normal/standard/ routine flow of surveillance data is usually from reporting sites to the next level up to the central level. The health posts were prepared and their weekly surveillance reports sent to the cluster health centers every Monday in the morning via a phone call. On the same

days, in the afternoon, the health centers in turn aggregate the surveillance reports received from the catchment health posts and send them to the health office. Similarly, the district health office receives reports from health centers via phone calls and sends them to the Sheger city Health Department on Tuesday afternoon. However, the hypertension surveillance system is not like this system; it is not fully integrated into the routine healthcare delivery system and is not well implemented throughout the year. Community and health facilities, especially health posts, are the main sources of information. The report was submitted to the higher level through a phone call, followed by paper-based report submission. All 11 health centers and 1 hospital have phone calls and they communicate with the next level via their mobile phone. All the district health offices have a mobile phone call and Wi-Fi network. As represented in Figure 2, the flow of surveillance data and information extends from health facilities to a higher level, whereas supervision and feedback follow the reverse direction(Figure 40).

7.2.4.2.2 Availability of surveillance guidelines

7.2.4.2.2.1 Reporting formats and documentation

The national PHEM guidelines are available at the district level and at all visited health centers. However, hypertension guidelines were not available separately at all health facilities.However, there was an Ethiopian Primary Health Care Guideline (EPHCG). There was no indicator of hypertension disease included in the standard weekly reporting format in the visited health centers, but there was monthly reporting of disease which included hypertension disease indicators. Regarding the documentation of a monthly surveillance report, all health centers and the district health office had a copy of each monthly report in the file cabinet.

7.2.4.2.2.2 Case detection and registration

The case definition for hypertension disease was not available at the district health office or all health facilities. However the PHEM focal person at the district health office and visited health centers fully understood the hypertension case definition. However the hypertension case definitions were posted on a wall or notice board of the all health centers.

7.2.4.2.2.3 Analysis and Interpretation of Surveillance Data

All the health centers had at least one computer in addition to the desktop computer for the health management information system. However, none of the health centers used computers for the analysis of surveillance data. The health centers send their monthly surveillance reports which include only the total number of cases and performed activities to the district health office, without analysis or interpretation of the data. The district health office and all health facilities had no denominator that helps to describe the surveillance data epidemiologically in terms of person, place, and time, such as the total number of people disaggregated by age group, sex, and

kebeles. However, the district health office simply aggregates the reports received from the health centers and sends them to the zonal health department without performing analysis of the surveillance data.

7.2.4.2.2.4 Supportive Supervision and Feedback

Even though the district health office and health centers had a supervision plan, neither integrative nor specific supportive supervision was conducted for hypertension. All the study sites did not have a supervision checklist for assessing PHEM activities including hypertension surveillance in detail and no written feedback was provided to the district or for the all health centers or hospitals(Figure 40).

7.2.4.3 Assessment of Qualitative Attributes

7.2.4.3.1 Simplicity

Of the respondents, 61.8% (21 of 34) were stated case definitions for hypertension were easily applicable and explained by their tongue language.A total of 54.7% (18 of 34) and 85.3% (29 of 34) of the respondents said the method used for the collection of HTN surveillance data was simple for detecting hypertension cases and that the reporting of hypertension surveillance data within the IDSR system was easy, respectively.Additionally,67.6% (23 of 34) of the respondents that reporting hypertension surveillance data is easy. A total of 55.9% (19 of 34) of the respondents stated that the instructions and guidelines for completing the hypertension reporting forms were not applicable(Table 40).

7.2.4.3.2 Acceptability

A total of 58.8% (20 of 34) of the respondents claimed that hypertension is regarded as significant for public health in the community, and the majority of them, 61.7% (21 of 34) said that fellow health personnel in this facility were interested in HTN surveillance activities. In addition, 79.4% of the respondents claimed that we had made great contributions to the detection and screening of hypertension(Table 40).

7.2.4.3.3 Flexibility

A total of 79.4% (27 of 34) the respondents said no change in case definition and 91% (30 of 34) stated that there was no change in reporting of HTN records. Moreover, there is no a new data tool for reporting hypertension. One hundred percent (34 of 34) of the total respondents stated that HTN surveillance and response within the existing IDSR system easily adapt to changes in technology(Table 41).

7.2.4.3.4 Usefulness

Usefulness was considered poor because all of respondents(100%) disagreed that hypertension (HTN) surveillance and response within the IDSR system have enabled us to achieve the

surveillance objectives in the past year in this woreda. Additionally, almost all of the respondents claimed that HTN surveillance data did not inform program implementation for diseases control in the past year in this health facility and that the surveillance data generated within the IDSR system have not stimulated research activities in this health facility. Although HTN surveillance and response activities in this health facility are considered important and provide sufficient information for prompting public health action to prevent hypertension within the IDSR systems in this health facility, HTN surveillance data generated within the IDSR system did not provide an estimate of morbidity magnitude, trends or associated risk factors in the health facilities used for prevention and control measures(Table 41).

7.2.4.3.5 Stability

A total of 91.3% (31 of 34) of the respondents said there was continuous functionality of DHS2, and 90% (30 of 34) of the respondents said of good internet connectivity. All (100%) of the respondents said there was availability of a BP apparatus. However, all of them (100%) claimed that there was an interruption in carrying out HTN surveillance system because of staff turnover. Overall the stability of the system has been challenged by a shortage of budget, logistics, staff turnover and lack of update training.

7.2.4.4 Assessments of Quantitative Attributes

7.2.4.4.1 Timeliness

At the visited health facilities and at the district level, the date the report was received was not recorded; as a result it was difficult to calculate the timeliness of the report. However, the overall average surveillance report timeliness calculated by the all woreda health office in August 2023 averaged 63.6%.

7.2.4.4.2 Completeness

The completeness of surveillance reports varies from one health facility to another. After we assessed the DHIS2 score for monthly reports, the completeness of the reports provided by the health centers in Sheger city was greater than the expected level of 80% in 2023 March, April,May,June,July and August as shown in().We could not obtain data from the health office during the data collection period(

Figure 41).

7.2.4.4.3 Sensitivity and Data quality

Only 26% (109 of 420 total cases of HTN) were identified by HTN surveillance during mass screening and the majority of the cases were indentified and recorded during patients' passive attendance or visited health facilities. The amount of reported documentation and the quality of

data were poor at all health facilities. However, none of these studies included lipid profile, weight measurement, smoking status or physical activity.

7.2.5 Discussion

Public health surveillance systems should be periodically evaluated to assess their effectiveness, focusing on the attributes most relevant to the system's objectives(17).The hypertension surveillance system's performance was assessed in Sheger city, Oromia.

The surveillance system was not fully integrated into routine operations and was not implemented tho. Health facilities in the districts were the key information sources, with a well-organized data flow from lower to upper levels. While reporting facilities understood the communication lines, challenges included limited engagement in weekly surveillance activities and insufficient regular communication.

Effective public health responses rely on the surveillance system's ability to deliver reliable, timely, and comprehensive information to support action(19,20). The study found that hypertension was reported monthly instead of weekly, with an overall report completeness of 74% from health centers, falling short of the 80% target set by the World Health Organization(19). Additionally, our results differed from those of a public health surveillance system evaluation in Dangila district, Northwest Ethiopia, which showed a completeness of surveillance reports exceeding the national target(21).This finding suggested that there was no acceptance of the hypertension surveillance system and not all stakeholders involved in the system.

At all health facility levels, the date reports were received was not recorded, making it challenging to assess report timeliness. However, the average timeliness of surveillance reports from all district health offices in August 2023 was 63.6%, below the 80% target set by the World Health Organization(19), but aligned with study done at Ghana(61%)(22). Furthermore, the reporting timeliness in our study lags behind of the 95% national target established by the Health Sector Transformation Plan for 2019–20(23) and 94.6% of the reporting timeliness was reported from a study conducted in Dangila, Northwest Ethiopia(21). This suggests poor communication, as the low timeliness in the study area may stem from insufficient regular communication between reporting sites and higher levels.

According to national guidelines, surveillance data analysis and interpretation should occur weekly at each level, from health facilities to the national level. However, hypertension surveillance data were aggregated and reported monthly, with health centers, hospitals, and district health offices not consistently monitoring or analyzing these findings. Similar results were observed in a study conducted in Dangila district, Northwest Ethiopia(21). Surveillance

data must be analyzed to provide essential information for decision-making and public health action. Poor performance in data analysis may be attributed to skill gaps in data management, weak supervision and feedback systems, lack of commitment, and insufficient ongoing training. The district health office has an Emergency Preparedness and Response Plan (EPRP) that lacks budgetary support and supplies for emergency responses and the hypertension surveillance system. The rapid response team and multisectoral epidemic management committee in the district were not fully operational, and the epidemic management committee did not maintain documented meeting minutes, reviews of plans, or lessons learned from post-epidemic evaluations. These findings align with a study conducted in Dangila district, Northwest Ethiopia(21). National guidelines state that surveillance data should be analyzed weekly at all levels, from health facilities to the national level. However, hypertension surveillance data were aggregated and reported monthly, with no monitoring or analysis by health centers, hospitals, or district health offices. Similar findings were noted in Dangila district, Northwest Ethiopia. Effective analysis is essential for decision-making and public health action. Possible reasons for poor performance in data analysis include skill gaps, weak supervision, lack of commitment, and insufficient ongoing training.

The district health office has an Emergency Preparedness and Response Plan (EPRP). And lacks budget and supplies for emergencies and hypertension surveillance. The rapid response team and multisectoral epidemic management committee are not fully functional, with no documented minutes or evaluations. Our findings align with a study in Dangila district, Northwest Ethiopia. Poor preparedness and response to public health emergencies negatively impact the community. Possible reasons for the rapid response team's dysfunction include lack of capacity building, absence of ownership, and insufficient supervision from higher officials.

Of the seven(7) attributes assessed, sensitivity, data quality, usefulness, acceptability, and timeliness were rated poor, while only simplicity was deemed good. The overall usefulness of the Sheger city surveillance system was considered poor, failing to meet its objectives for monitoring hypertension trends and linking to public health action. The average completeness of surveillance reports was low (74%), and data availability was slow. The system's effectiveness is limited by budget shortages, logistical issues, staff turnover, lack of updated training, and weak supervision. These findings align with studies from Dangila district, Northwest Ethiopia.
(21).

7.2.6 Conclusions and recommendations

The district's surveillance system was simple. To increase the system's performance, the surveillance system's; sensitivity, data quality, usefulness, acceptability, and timeliness need to

be improved. The total monthly report timeliness, the completeness of the district health office and the overall completeness of the health facilities were below the target. The structure of the surveillance data flow was from the health center at the bottom to the corresponding upper level, and the surveillance system was not completely integrated into the standard health care delivery systemNevertheless, there are several shortcomings in the district surveillance system: inadequate channels of communication between surveillance tiers, insufficient analysis and interpretation of the survelliance data on a regular basis, lack of budget, weak supportive supervision and feedback system.Therefore,to strengthen the performance of the survelliance system in the prevention and control of hypertension, building a strong line of communication, fully engaging into routine, medicine, increasing acceptability, increasing the usefulness of the data, regularly analyzing, and interpreting of surveillance data, preparing epidemiological bulletins and disseminating informationto the stakeholders and providing regular suppotive supervision and feedbackare recommended for the survelliance focus of the district. Furthermore, health department in Sheger city are required to establish functional the rapid response teamand epidemic management committes, allocate budgets for surveillance activities, and provide capacity buildingtraining for survelliance officers at the district and health facility levels.

Abbreviations and Acronyms

AAU	**Addis Ababa University**
Bsc	Bachelor of science
CDC	Center of Disease Control
CI	Confidence Interval
CVD	Cardiovascular Disease
CSA	Center of Stastical Agency
DHS2	Digital Health Software
DM	Diabetes Mallitus
EFETP	Ethiopia Field Epidemiology training program
EPHI	EthEthiopian Public Health Institute

EPHCG	Ethiopian Primary Health care Guideline
EPRP	Emergency prepadness and Response Plan
FMOH	Federal Ministry Of Health
HC	Health Center
HTN	Hypertension
IDSR	Integrated Disease Surveliance and Response
NCD	Non-communicable disease
OPD	Outpatient departement
PHEM	Public Health Emergency Management
PHCU	Primary Health Care Unit
ORHB	Oromia Regional Health Bureau
RHB	Regional Health Bureau
WHO	World Health Organization

Declaration

Ethical approval and consent to participate: Permission to proceed with the study Ethical approval was receipt from the Public Health Emergency Management and Health Research Directorate(PHEMHRD) of Oromia Regional Health Bureau(BFO/MBJG/1-16/268) and written informed consent was obtained from all participants for publication of the result. The names of Ethical committees are:- Biranu Kenate(birhanukenete@gmail.com), Dereje Diriba (ddtk2004@gmail.com), Daniel Bekele(danielbekele535@gmail.com) and Chala Befikadu.

Author Contributions: YT conceptualized and designed the study, collected the data, analyzed the data, interpreted the data and drafted the manuscript AA, ZH, DD and DB contributed to the analysis and interpretation of the data, and critical revision of the manuscript all authors read and approved the final manuscript.

Consent for Publication. Written informed consent was obtained from all participants for publication of the result.

Availability of data and material: Raw data can be made available on request to the corresponding author.

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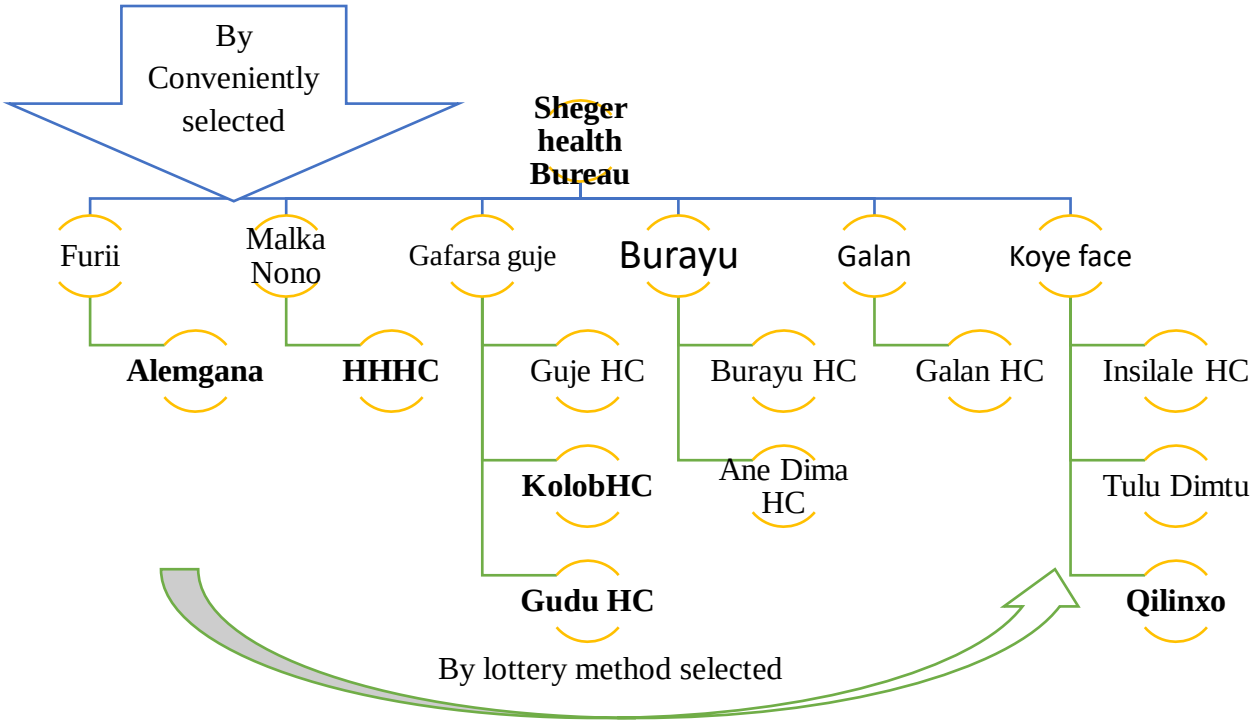

Figure 39:Schematic representation of the sampling procedure for the evaluation of hypertension surveillance systems in Sheger city, Oromia, Ethiopia, 2023

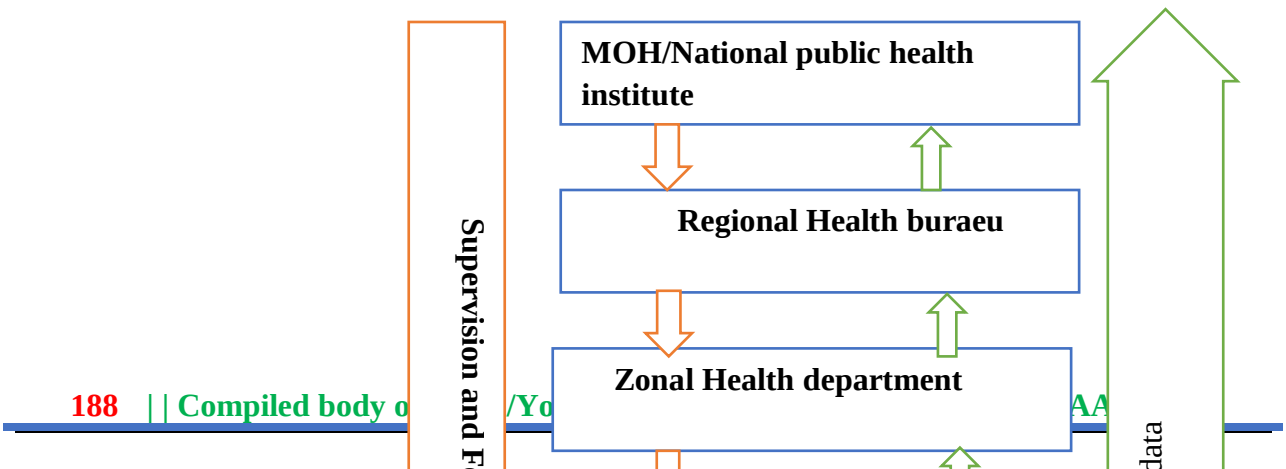

Figure 40:. Diagram showing the flow of survelliance data and feedback in the Sheger city district, Oromia, Ethiopia, 2023

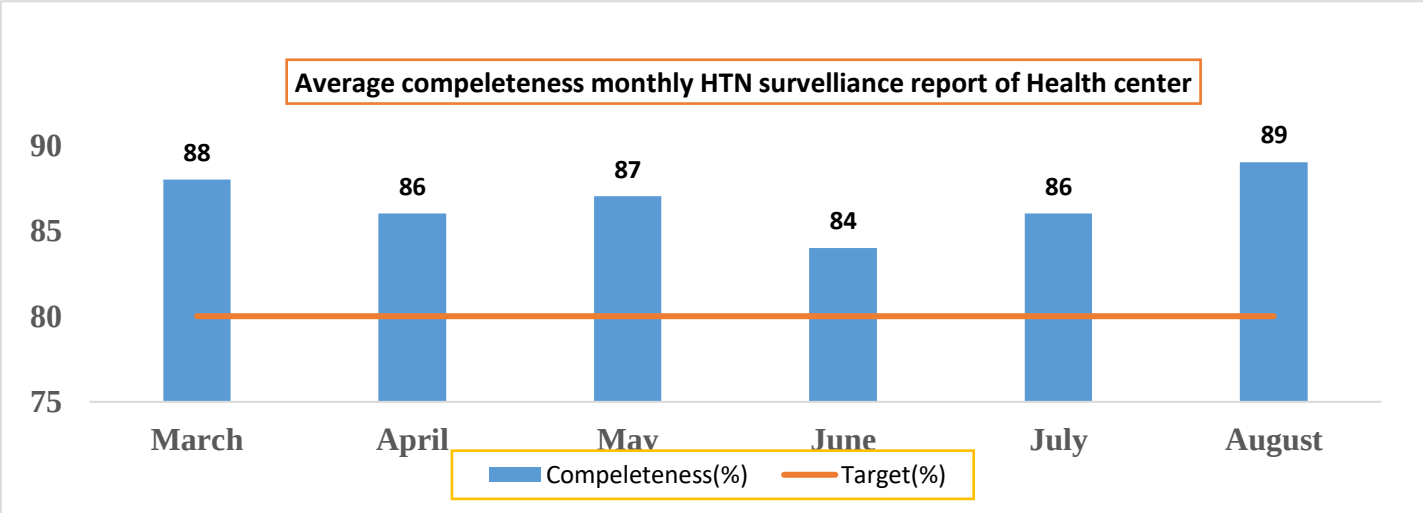

Figure 41:Overall completeness of health center HTN monthly surveillance reports in the Sheger city district, Oromia, Ethiopia, from March to August 2023

Table 39:Case definition of hypertension

Category of Blood	Systolic Blood Pressure	Diastolic Blood Pressure

pressure		
Normal	< 120 mmHg	And <80mmHg
Elevated	120-129 mmHg	And <80mmHg
Stage of Hypertension		
Stage 1	130-139mmHg	Or 80-89mmHg
Stage 2	≥140mmHg	And/or ≥90mmHg

Table 40:Implementation Status of the qualitative attributes(Simplicity and Acceptability) of the Hypertension surveillance system in Sheger city, Oromia, Addis Ababa, August to September 2023.

Qualitative indicators	Analysis
Simplicity	
Reporting of HTN surveillance easy	85.3% (29 of 34) of respondents claimed easy to report
Forms for reporting HTN	67.6% (23 of 34) of them stated easy to fill the report
Instructions and guidelines	55.9% (19 of 34) of them said not applicable.
Case definition	61.8% (21 of 34) of them defined case definition
Methods used for collection of HTN surveillance data are simple	54.7% (19 of 34) of them claimed /agreed/.
Method of analysis	60.5% (21 of 34) of Respondents said easy to analysis of HTN surveillance data
Acceptability	
My contribution/s and inputs/s to the existing IDSR system is/are considered valuable	79.4 % (27) had contributions.
Fellow health personnel in this facility show	61.7% (21 of 34) of them said no interest.

interest in HTN surveillance activities	
HTN are considered of public health importance in this community.	58.8% (20 of 34) of them said HTN have public Health importance

Table 41:Implementation Status of the Qualitative Attributes (Flexibility and Usefulness) of the Hypertension Surveillance System in Sheger city, Oromia, Addis Ababa, August to September 2023

Flexibility	
Changes in case detection	79.4% (27 of 34) Respondents said no change in case definition
Changes in thereporting of the hypertension records	91% (30 of 34) stated that not changed in reporting of HTN records
Usefulness	
Action taken on data generated	All of them(100% of the respondents said no action was taken on the data
Action taken by authorities	No specific action was taken on the data generated to improve the performance of the hypertension surveillance system
Data analysis	100% (34 of 34) of respondents said they did not analyze hypertension data

Table 42:Implementation Status of the Quantitative Attributes; Sensitivity, Data Quality Timeliness of the Hypertension Surveillance System in Sheger city, Oromia, Addis Ababa, August to September 2023

Sensitivity	%
Proportion of cases detected by system vs records in register	26% (109 of 420 total case) identified by HTN surveillance

	during mass screening
Data quality	
Percentage of records that include age	100% (420 of 420)
Proportion of records that include sex	100% (420 of 420)
Proportion of records that include smoking status	0% (none of them out of 420)
Proportion of records that include physical activity	0% (none of them out of 420)
Proportion of records that include lipid profile	0% (none of them out of 420)
Proportion of records that include weight	0% (none of them out of 420)
Timeliness	
Proportion of records not reported on time to the monitoring and evaluation officer/DHS2/by those in charge at the health facility	36.8% (155 of 420) of records were not reported on time to the monitoring and evaluation officer/DHS2/
Median time to fill in a hypertension patient form	Average time of 17 min (range, 15–20 min) to fill in the form

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CHAPTER EIGHT:ABSTRACTS FOR SCIENTIFIC PRESENTATIONS

8.1 EVALUATION OF HYPERTENSION SURVEILLANCE SYSTEM, SHEGER CITY, OROMIA, ETHIOPIA, OCTOBER, 2023

ABSTRACT

Background: Hypertension (HTN) is a powerful risk factor for fatal and nonfatal cardiovascular disease events, are a major global health concern. In 2016, an estimated 1.13 billion adults and about a billion people, 7.5 million death in 2021 had hypertension worldwide and , with two-thirds of them living in low and middle-income countries. Despite high burden of NCD, especially hypertension in Sheger city, an evaluation of hypertension surveillance systems has not been conducted. Therefore, we evaluated the performance of hypertension surveillance systems and key attributes in Sheger city.

Methods: We conducted mixed quantitative/qualitative study design August to September 2023 among 12 health facilities and 12 health Office /study units in Sheger city. The qualitative study involved a purposively selected 34 key-informants. Data were collected using updated guidelines for evaluating surveillance systems based on CDC's framework.

Result: Records of 24 study units were reviewed and 34 key informants participated. The structure of surveillance data flow was from the health facilities to the respective upper level. Emergency preparedness and a response plan were available only at the district level. Overall monthly report completeness and timeliness of health facilities were 74% and 66 % respectively. We found weak supportive supervision and feedback, and no regular analysis and interpretations of surveillance data. The participation of surveillance stakeholders in implementation of the system was poor. The surveillance system was found to be easy to implement, not representative, and can't accommodate and adapt to changing operating conditions. Report documentation and quality of data was poor at lower level health facilities. The stability of the system has been challenged by a shortage of budget, logistics, staff turnover and lack of update trainings.

Conclusion: The surveillance system was simple. Quality of data, timeliness, completeness, useful, acceptable, flexible, and representative and the stability of the system were attributes that require improvement. The overall performance of hypertension surveillance systems was weak. Hence, increase acceptability, usefulness system, regular analysis of data, preparation, and

dissemination of epidemiological bulletin, capacity building, and regular supervision and feedback are recommended to enhance performance of the system.

Keywords: surveillance system evaluation, Hypertension, Sheger city.

8.2 Cholera Outbreak Investigation And Response At Haramaya Woreda, East Hararghe, Oromia Region, Ethiopia, 2023. /case-control study/

ABSTRACT

Background: Cholera remains a disease of public health importance in Ethiopia associated with high morbidity and mortality. In August 2016, East Hararghe Zonal Health Bureau was notified of an increase in suspected cholera cases in Haramaya woreda.Oromia health bureaus' surge teams and Field epidemiology residents' were deployed to investigate the outbreak with the objectives of verifying the diagnosis, identifying risk factors and make appropriate control measures to control the outbreak.

Methods: We conducted an unmatched case-control study. We defined a cholera case as any person aged 2 years or older presenting with acute watery diarrhea and severe dehydration or dying from acute watery diarrhea in Haramaya community and/or in areas where a cholera outbreak has been declared, any person presenting with or dying from acute watery diarrhea. We identified community controls. A total of 50 cases and 100 controls were recruited. Structured questionnaires were administered to both cases and controls. One stool samples from case-patients and 14 water samples from the community water source were collected for laboratory investigation. We performed univariate, bivariate& Multivariate analysis using statistical package software for social science version 26.

Results: The mean age of cases and controls was 18.60 years and 19.60 respectively. Females constituted 62 % (cases) and 51 %(controls). The attack rate was about 1.9 per/10,000 peoples with a CFR of 4%.One stool specimen tested positive for V.cholerae. The water source and environment were polluted by open defecation. Compared to controls, cases were more likely to have drank from unprotected natural spring water (AOR 12.1, 95% CI: 5.4–27.3),whose highest level of their education being primary school (OR 1.5, 95% CI: 0.6–3.8),males (OR:1.568,95% CI:0.784-3.134),age≥30 years (OR1.056, 95%CI:0.478-2.329) were independent associated risk factors.Whereas,latrine usage OR 0.792,95% CI;0.351-1.785),use chlorine (OR 0.752,95%CI;0.378-1.497),knows ways of cholera prevention (OR 0.451,95% CI:0.167-1.21& Good hand hygiene (OR 0.527,95%CI:0.256-1.084) were found to be protective.

Conclusion & Recommendation: V.cholerae was the cause of the outbreak in Haramaya. Drinking water from unprotected natural spring water, didn't use chlorine, lack of knowledge on ways of prevention and poor hand hygiene were significantly associated with the outbreak. We initiated hand hygiene and water treatment to control the outbreak.

Keywords: Unmatched case control ,Cholera outbreak, Hand hygiene, spring water,Haramaya.

CHAPTER NINE:OTHER ADDITIONAL OUTPUT

9.1 Oromia Health Bureau,Public Health Emergency Management And Health Research Directorate Weekly PHEM Bullitin

9.1.1 Epidemiological WHO Week 31, 2023

Highlights of week 31, 2023

- ➔ Both Regional surveillance report completeness and timeliness were 83 % this week.
- ➔ Confirmed Malaria cases decreased by 2314 (8%) as compared to WHO week 30.
- ➔ Suspected Measles cases decreased by 102 (36%) & SAM cases decreased by 1234 (23%) as compared to week 30.
- ➔ No **COVID-19** case.
- ➔ Zero cases of Covid-19 were reported this week.

INTRODUCTION

This bulletin serves to summarize weekly surveillance data & performance of ORHB/PHEM on epidemic-prone diseases and other public health emergencies. It comprises report timeliness,

completeness, trends of priority diseases, and response activities.t also provides feedback on surveillance activities for WHO week 31, 2023.

A.Weekly Surveillance Reporting status

This week, both completeness and timeliness of reports from government health facilities in oromia region were 83%. Most of the zones and towns reported above the expected target, below targets reported were,west showa(78%),Horo Guduru wollega(74%),West Wollega(66%),East Borana (59%) and North showa(53%),including those not reported, East Wollega , town of Bishoftu and dukam.

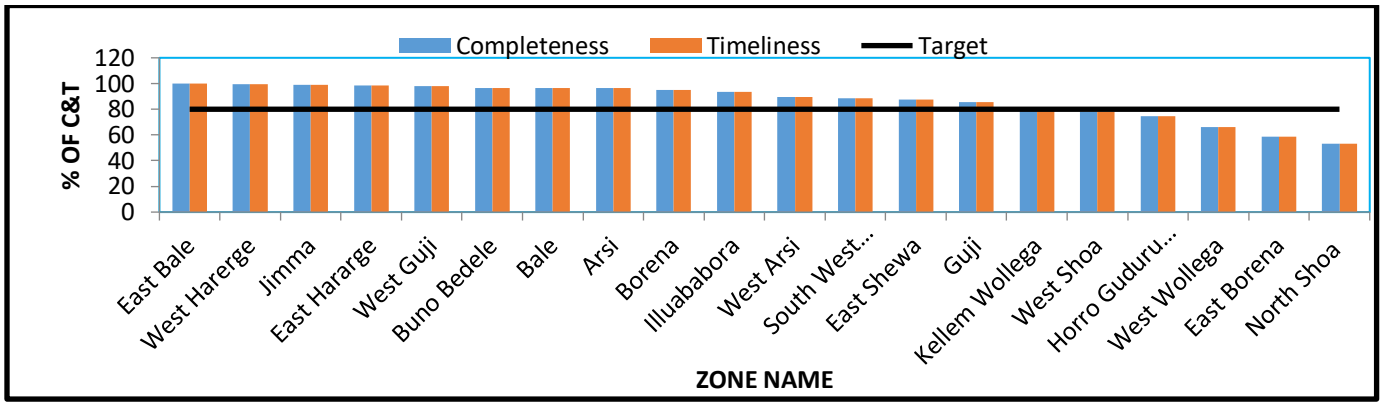

Figure 1: Report completeness and timeliness by zones, Oromia, WHO week 31, 2023

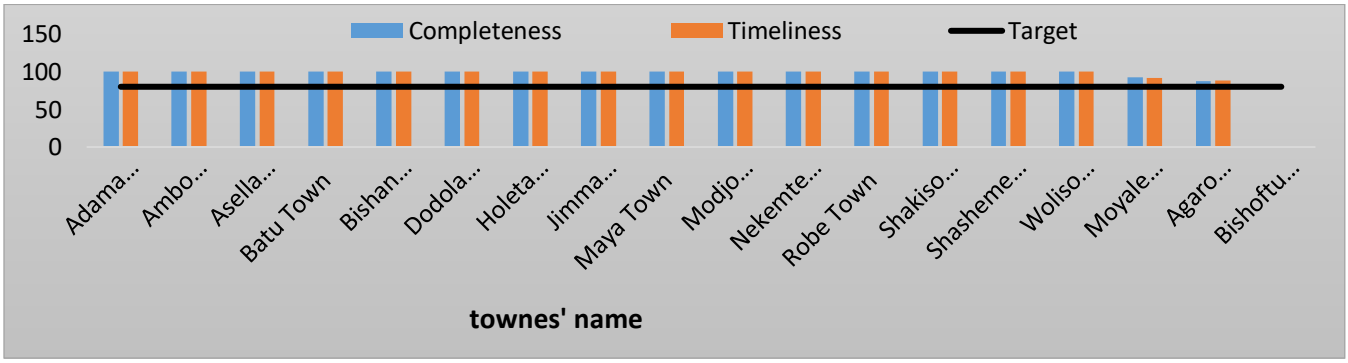

Figure 2: Report completeness and timeliness by towns, Oromia, WHO week 31, 2023

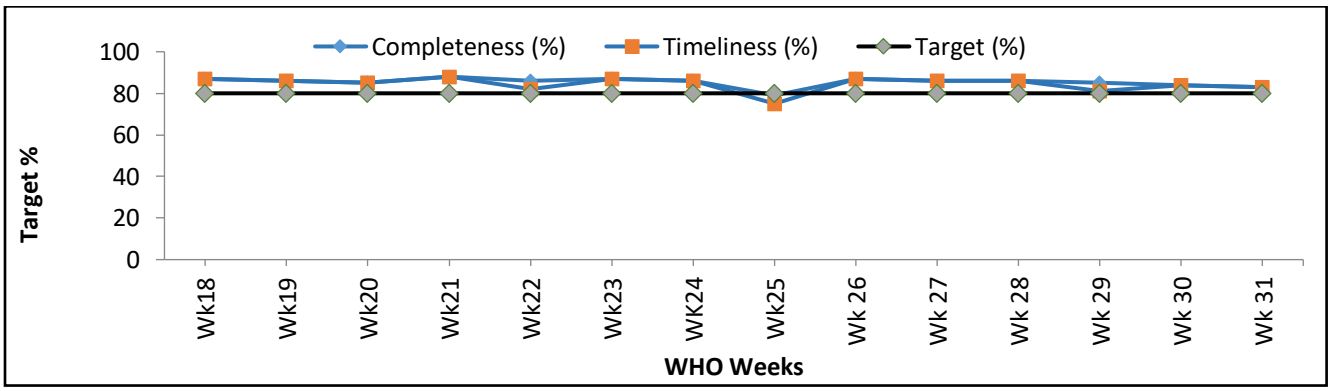

Figure 3: Trends of Regional surveillance report Timeliness and Completeness, WHO Week 18-31, 2023

B. Diseases or Condtions

Malaria

In this week, a total of 71,541 febrile cases were tested by laboratory of which 24,947 were positive with a positivity rate of 35%. Of the total confirmed malaria cases reported, 15,720 (63%) of them were plasmodium falciparum cases. A total of 6 deaths were reported from Buno Bedele (3), East Borana(2),West Wollega (1). 746(3%) malaria cases were treated as inpatients. The highest number of cases were from West Wollega 7648(31%),kellem Wollega 4423(18%),jima 2088 and Illubabor 2002 (8%) .

Table 1: Zones and districts reported high malaria cases, Oromia Region, WHO Week 31, 2023

Zones & District	Laboratory Examined	PF +PV	SPR	%from region/ zone
West Wollega	14944	7648	51	31
Babo Gambel	1678	891	53	12
Boji hekorsa	1003	790	79	10
Nejo Rural	1518	737	49	10
Youbdo	1143	665	58	9
Kellem Wollega	8357	4423	53	18
dale sedi	2075	1228	59	28
Gawo kebe	1195	808	68	18
Jimma	6771	2088	31	8
Shabe	1345	732	54	35
Gera	1052	575	55	26
Illuababora	6636	2002	30	8
Ale	319	107	34	5
alge sachi	310	59	19	3

East Shewa	2285	1461	64	6
Antale	625	216	35	15
fitche town	892	174	20	12

Confirmed Malaria cases decreased by 2,314 (8%)as compared to week 31.

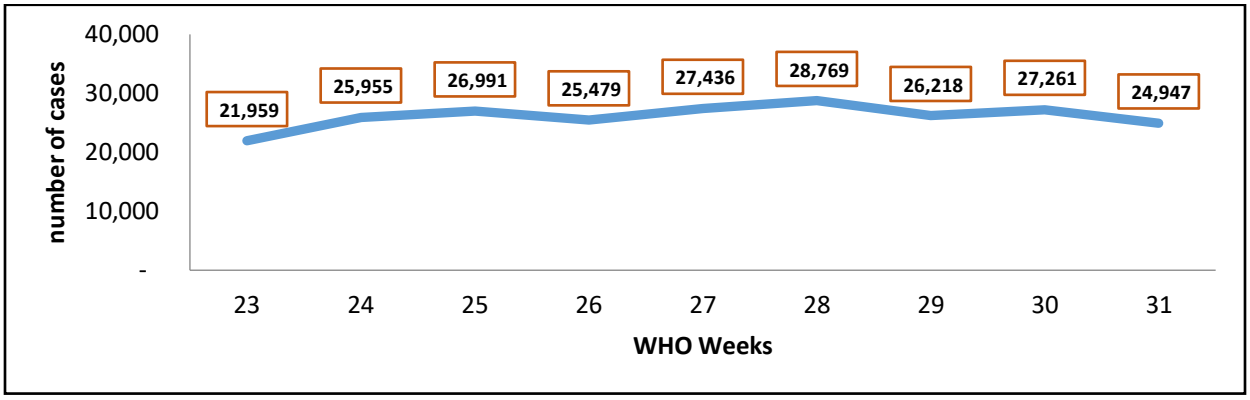

Figure 4: Trends of weekly confirmed malaria cases, Oromia Region, WHO Weeks 23-31, 2023

Dysentery

In this week, a total of 3,087 dysentery cases were reported to the region with 20 admissions and zero deaths. The number of cases increased this week by 56(2%) compared to week 30. The highest number of cases were reported from West Hararge 269(4%),sheger city 264(4%),East Hararge 248(4%) and jima 233(4%).

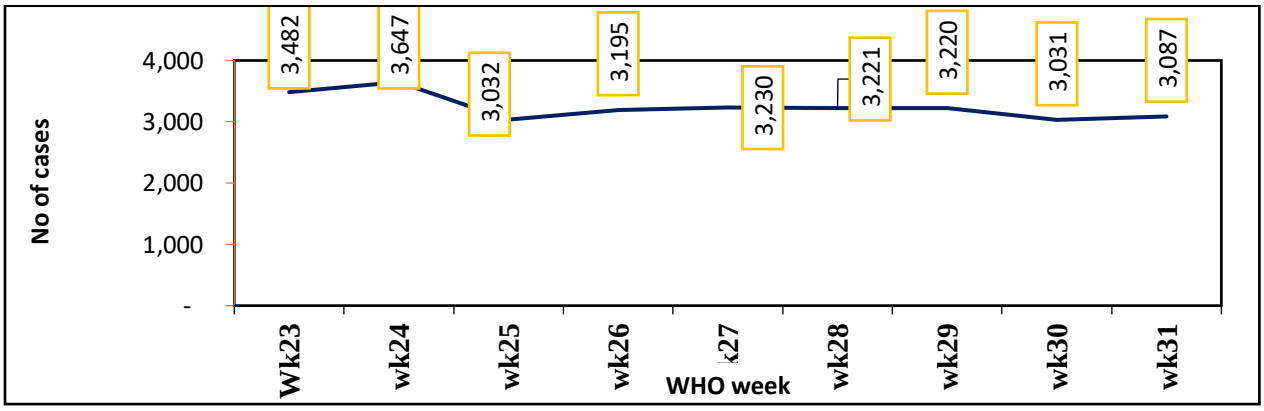

Figure 5: Trends of dysentery cases, Oromia Region, WHO Weeks 23- 31, 2023.

Measles

This week, a total of 214 suspected measles cases with one death reported from west arsi zone. The number of cases decreased by 102(36%) as compared to week 30. The highest number of measles cases were from Buno Bedele 79(37%),West hararge 27(13%) and West Arsi 22 (10%).Arsi(1),sheger city(9) and Adama town(2).

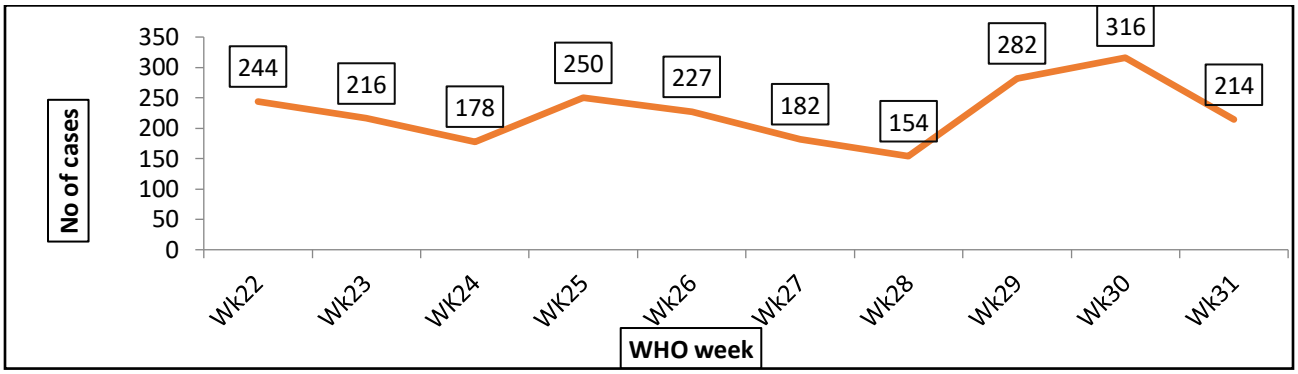

Figure 6: Trends of measles cases, Oromia Region, WHO Weeks 22-31, 2023

Acute Flaccid Paralysis (AFP)

In this week, 7 AFP cases were reported to the region from Guji(2),jima town(2),Holota town(1),North showa(1) and West hararge(1).

NNT

In this week ,2 cases were reported to the region from Guji (1) Adola hospital and West Guji(1) from Bule Hora Hospital.

Malnutrition

In this week, new 3,292 Severe Acute Malnutrition (SAM) cases with 498(15%) cases admitted to SC were reported to the Region.A total of 4 deaths from West hararge (1)West Arsi(1),West Guji(1) and agaro town(1).The highest number of cases were reported from East hararge 615 (19%),West hararge 571(17%),West Arsi 298 (9%),West Guji 271(8%) and Arsi 195(6%). SAM cases decreased by 1234(23%) as compared to week 30. Trends of SAM cases for the last 09 consecutive WHO weeks are shown below (Fig: 7)

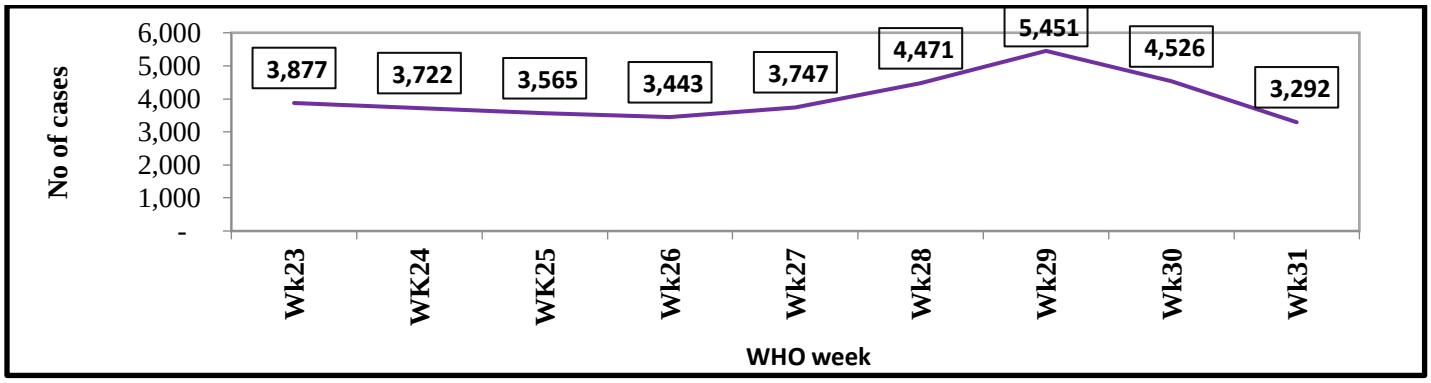

Figure 7: Trends of malnutrition cases, Oromia Region, WHO Weeks 23-31

Meningococcal Meningitis

In this week, a total of 69 suspected meningococcal meningitis cases, and 53 admissions with zero deaths were reported to the region. Accordingly, the cases were from East hararge(11),East Borana(7),Guji,West hararge(6),West showa(6) , robe town (4),West Arsi (4),Holota town(3),south west showa(3),Woliso town(3),East Bale(2),Horo Guduru wollega(2),nekemte town(2),West Guji(2),kellem Wollega (1),North showa(1),West Wollega(1).

Anthrax

Zero cases of Anthrax were reported to the region this week.

Relapsing Fever

This week, a total of 14 relapsing fever cases with no death were reported to the region. Cases were from Arsi(1),sheger city(9) and Adama town(2)

Maternal deaths

In this week, 8 maternal deaths were notified to the region. Accordingly, from Adama town(1),East Bale(1),East hararge(2), Horo Guduru wollega(2) and West hararge(2) deaths

Perinatal death

In this week, 59 perinatal deaths were reported to the region. In line with this, deaths were from south west showa(5),West showa(5), Adama town(4), Asela town(4),Guji (4),Horo Guduru wollega (4),Illubabor (3),kellem wollega (3), Nekemte town (3) , Borana(2),East bale(2),East showa (2), jima town(2),shashamane town(2),West hararge (2),West Wollega(2), Arsi(1),Bale(1),Batu town(1),East Hararge(1), Holota town(1),jima (1),moyale town(1),sheger city(1),West Arsi(1) and Woliso town(1).

Cholera

In this week, a total of 134 Cholera cases with no death were reported to the Region. The reports were from sheger city 59(44%),Arsi 35(26%) , West Guji 30(22%),with cases (5) from west Arsi ,(3) from Guji and (2) from shashamane town.

Dracunculiasis (Guinea Worm)

Zero cases of suspected guinea worm were reported to the region this week.

Scabies

In this week, 669 scabies cases with nine admission were reported to the region. The highest number of cases were reported from south West showa 100(15%),West Guji 86(13%),jima 68(10%),West arsi and west showa 42(6%)by each.

COVID-19

This week, zero COVID-19 case was reported to the region.

Other cases

In this week, there were a total of 59 other cases and conditions were reported to the region other than the IDSR report. Of these 55 Dog & animal bites including 2 cases of chicken pox and 2 all other causes of morbidity.

In this week, 67 newly identified HIV cases were reported to the Region, of which 10 were recent infections and 45 of them were enrolled to the ART clinic. Of the 67 identified HIV cases, reports received were from jima town(10),East Borana(8),East showa(8),North showa(7), adama town (5), Nekemte town(5),West showa (5),sela town(3),Guji(3),Robe town(3),sheger city(3),Borana(2),moyale town (2),ambo town (1),Batu town(1) and west hararge(1).)

Response Activities

To contain the current cholera outbreak, strengthened surveillance, case management, and all necessary measures are undertaken at all levels to prevent and control the outbreak

Based on weekly surveillance reports, feedback is usually given to all zones and towns as time as possible

Health and nutrition task force meeting is held every two weeks and sometimes every month

On the basis of the COVID-19 pandemic, rumors received from any source, verified and risks are communicated as early as possible.

The Regional EOC was activated and "Free toll" 6955 is uninterruptedly working daily

Professionals were assigned to receive free calls from the public and rumors received are investigated and responded

Isolation of suspected cases & investigation for (COVID-19) are ongoing to protect the public from being infected. Testing and contact tracing are also conducted as routine activities.

Information dissemination on the prevention of COVID-19 is continually undergoing in all areas in the region.

Community-based surveillance was initiated for COVID-19 and hence HEWs carry out awareness-creation activities and report individuals suspected of COVID-19 to responsible authorities.

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9.1.2 Epidemiological WHO Week 33, 2023

Highlights of week 33, 2023

- ➔ Regional surveillance report completeness and timeliness were 87% and 72 % respectively this week.
- ➔ Confirmed Malaria cases increased 2,045 (6.4%) as compared to WHO week 32.
- ➔ Suspected Measles cases decreased by 12 (7%) & SAM cases increased by 929 (28%) as compared to week 32.
- ➔ Zero **COVID-19** case report received in this week.

INTRODUCTION

This bulletin serves to summarize weekly surveillance data & performance of ORHB/PHEM on epidemic-prone diseases and other public health emergencies. It comprises report timeliness, completeness, trends of priority diseases, and response activities.It also provides feedback on surveillance activities for WHO week 33, 2023.

1.Weekly Surveillance Reporting status

This week, completeness and timeliness of reports from government health facilities in oromia region were 87% & 72% respectively. Most of the zones and towns reported above the expected target, below targets reported were, West Showa (78%),West Wollega (74%),Horo Guduru Wollega(71%),East Borana (59%), North Showa(58%) and East Wollega(56%) with late reports from Arsi and Jimma . Unreported was Bishan Guracha town this week.

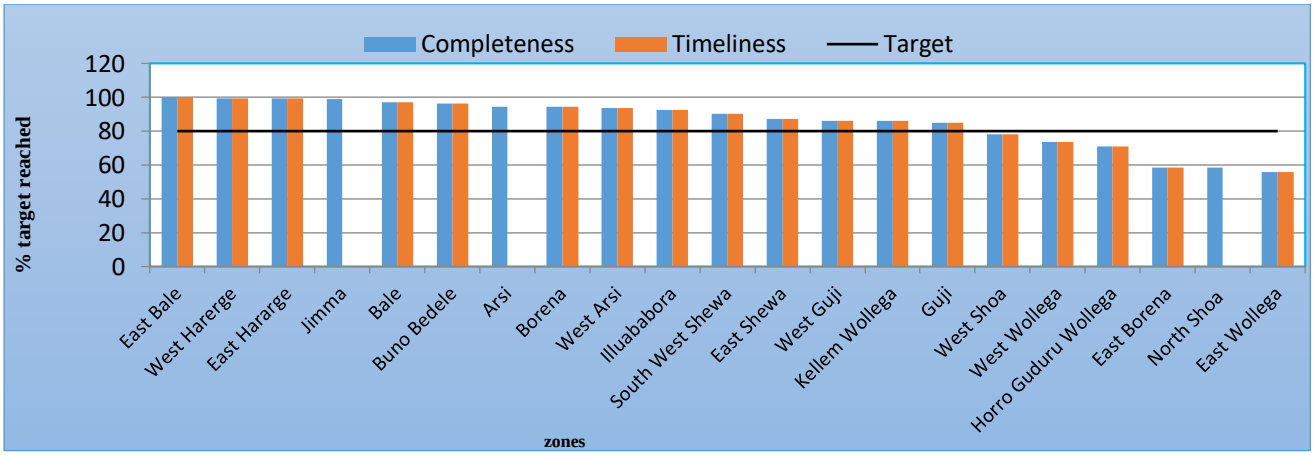

Figure 1: Report completeness and timeliness by zones, Oromia, WHO week 33, 2023

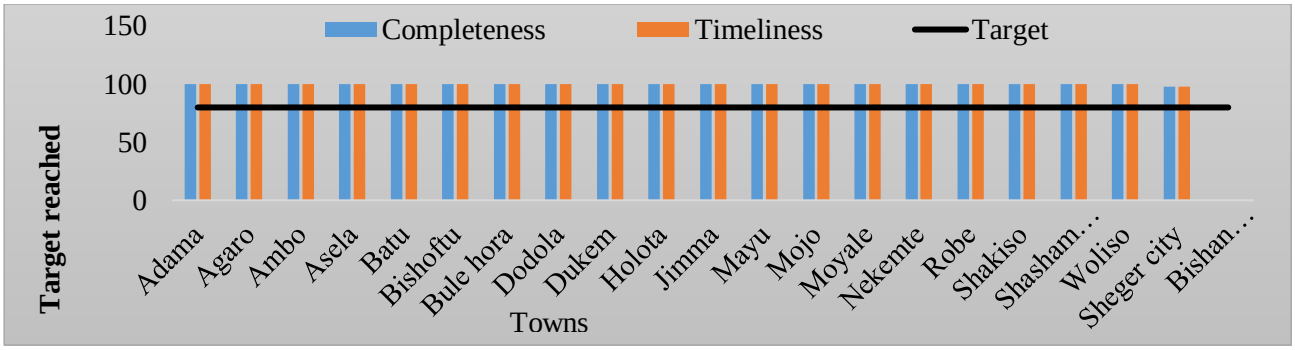

Figure 2: Report completeness and timeliness by towns, Oromia, WHO week 33, 2023

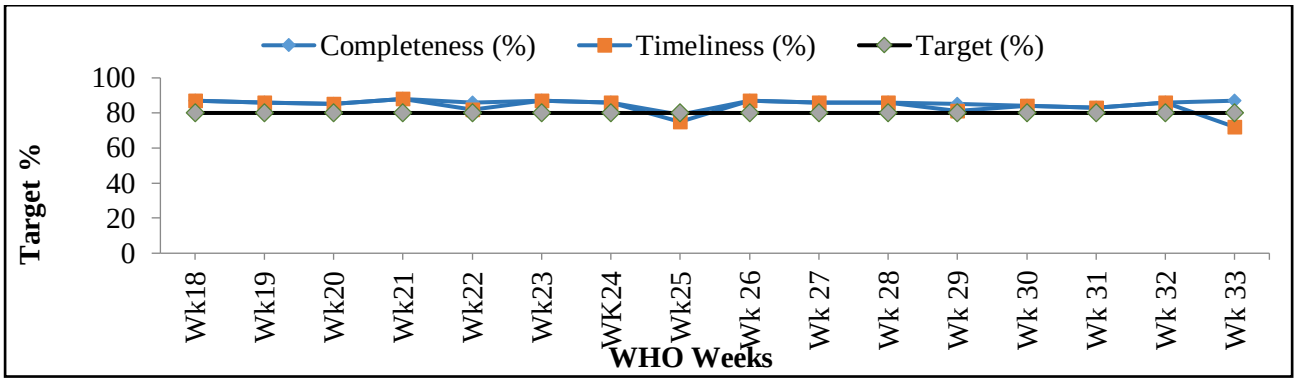

Figure 3: Trends of Regional surveillance report Timeliness and Completeness, WHO Week 18-33, 2023

2. Diseases or Conditions

2.1 Malaria

In this week, a total of 88378 febrile cases were tested by laboratory of which 33,896 were positive with a positivity rate of 38%. Of the total confirmed malaria cases reported, 21,878 (65%) of them were plasmodium falciparum cases. A total of 9 deaths were reported from West Wollega (6), kellem Wollega (2) & Guji(1).1205(6%) malaria cases were treated as inpatients. The highest number of cases were from West Wollega 11,548 (34%), Kellem Wollega 6,203(18%),Jima 2488(7%) and East Wollega 2471(7%).

Table 1: Zones and districts reported high malaria cases, Oromia Region, WHO Week 33, 2023

Zones & District	Laboratory Examined	PF +PV	SPR	%from region/ zone
West Wollega	20051	11543	58	34

Nejo Rural	1592	1592	100	14
Babo Gambel	1660	1660	100	14
Begi	1132	1132	100	10
Kellem Wollega	10258	6203	60	18
Dale Sadi	2281	1443	63	23
Lalo Kile	1702	1221	72	20
Gawo Kebe	995	938	94	15
Jimma	7935	2488	31	7
Shabe	1717	913	53	37
Gera	1267	644	51	26
East Wollega	5870	2471	42	7
Sasiga	1279	772	60	31
Guto Gida	699	345	49	14
Illuababora	5323	2181	41	6
Darimu	2173	1367	63	63
West Guji	2248	1336	59	4
Gelana	871	672	77	50
Abaya	632	280	44	21
East Shewa	5282	1042	20	3

Confirmed Malaria cases decreased by 2,025 (6%)as compared to week 32.

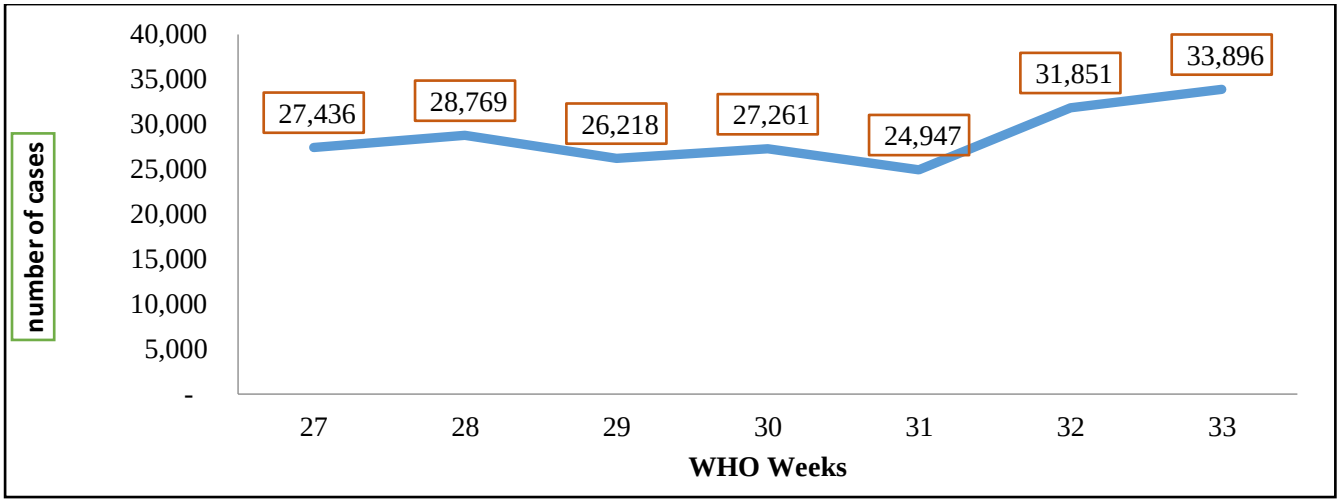

Figure 4: Trends of weekly confirmed malaria cases, Oromia Region, WHO Weeks 27-33, 2023

2.2 Dysentery

In this week, a total of 3,048 dysentery cases were reported to the region with 26 admissions and zero death. The number of cases increased this week by 51(2%) compared to week 32. The highest number of cases were reported from East Hararge 258(8%),Sheger City 224(7%),West Hararge 211(7%),West Arsi 206(7%),Jima 204(7%) and Arsi 189(6%).

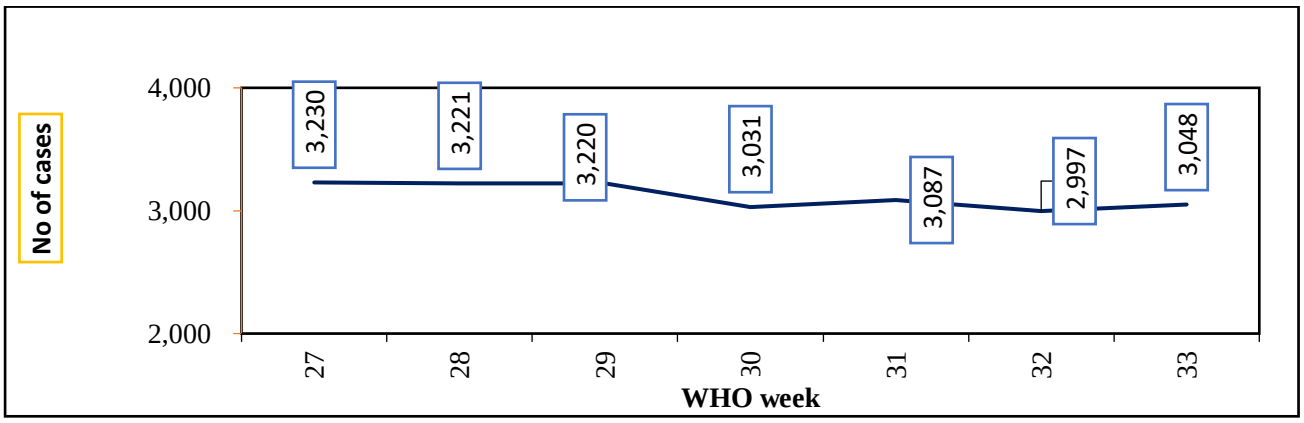

Figure 5: Trends of dysentery cases, Oromia Region, WHO Weeks 27- 33, 2023.

2.3 Measles

This week, a total of 157 suspected measles cases with one death reported from West Arsi zone. The number of cases decreased by 12(7%) as compared to week 32. The highest number of measles cases were from West Hararge 27(17%),East hararge 26(17%),Buno Bedele 21(13%),West Arsi 20(13%),West Guji 10(6%) and Robe town 8(5%).

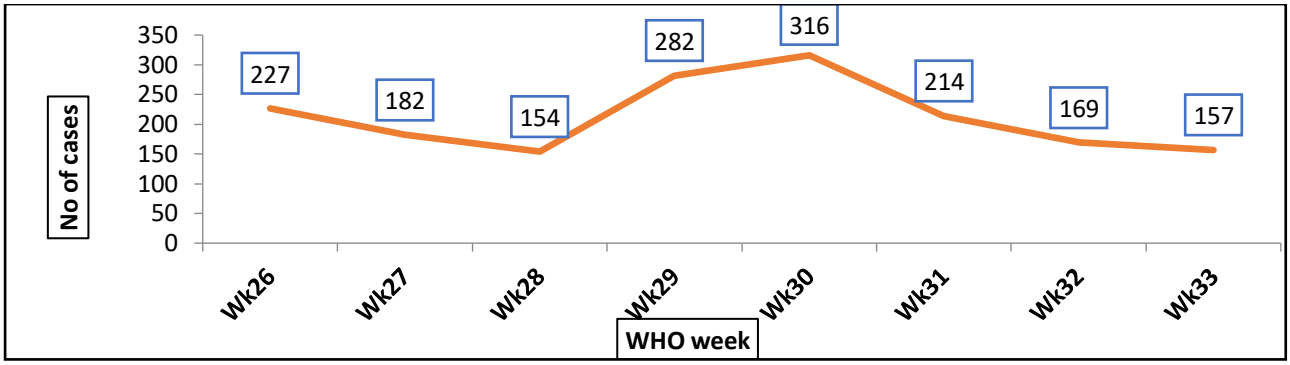

Figure 6: Trends of measles cases, Oromia Region, WHO Weeks 26-33, 2023

2.4 Acute Flaccid Paralysis (AFP)

In this week, 13 AFP cases were reported to the region from Borana(2),Jima town(2),followed by one case from each of the zone /town of Adama, Asela ,East hararge ,East Showa, East Wollega, Jima,Kellem Wollega,West Guji and West Hararge.

2.5 NNT

In this week ,one case reported from Holota town by this week.

2.6 Malnutrition

In this week, new 4,254 Severe Acute Malnutrition (SAM) cases with 549(13%) cases admitted to SC were reported to the Region. A total of 5 deaths from West Arsi (1),East Borana (1), Guji (1), West Hararge(1).The highest number of cases were reported from East hararge 653(15%),Kellem Wollega 588(14%),West hararge 532(13%),West Arsi 314(7%).

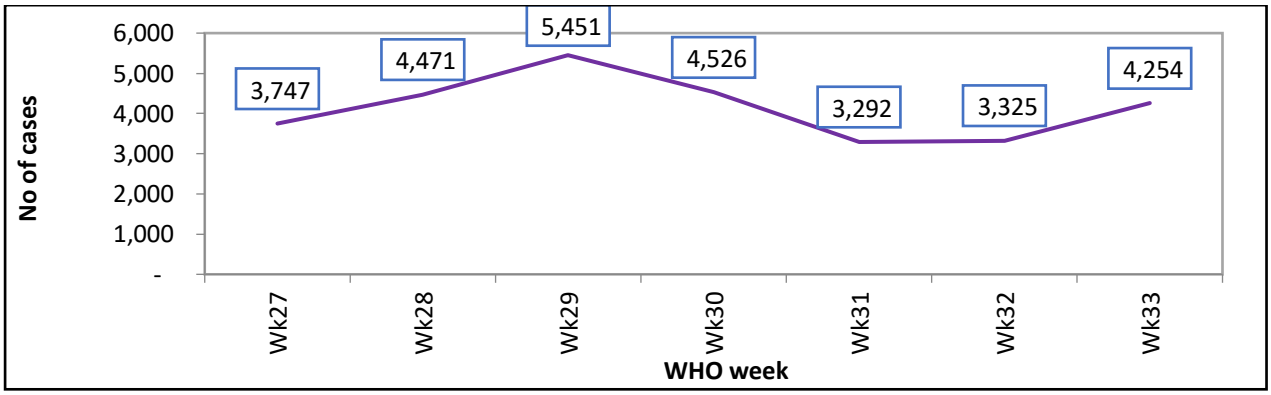

Figure 7: Trends of malnutrition cases, Oromia Region, WHO Weeks 27-33, 202

2.7 Meningococcal Meningitis

In this week, a total of 58 suspected meningococcal meningitis cases,& 43 admissions with zero death were reported to the Region. Accordingly, West Hararage (12)& (4) cases by each from East Hararge ,Horo Guduru Wollega ,Robe town,West Arsi and contribution of (3) cases from East Bale, East Borana , Guji, Holota town,Illubabor,West Guji followed by (2) cases from each of Arsi,Borana,Jima,South West Showa ,West Showa and (1) case from North Showa with (1) from Woliso town.

2.8 Anthrax

Zero cases of Anthrax were reported to the region this week.

2.9 Relapsing Fever

This week, a total of 25 relapsing fever cases with no death were reported to the region. Cases were from Sheger City(11),Nekemte town(8),Adama town(4) and West Hararge(2).

2.10 Maternal deaths

In this week, 10 maternal deaths were notified to the Region. Accordingly, from West Showa(2),&each (1) case was reported from the following town/zone of East Hararge ,East Wollega , Jimma,North Showa,Robe town,West Guji,West Hararge & West Wollega.

2.11 Perinatal death

In this week, 62 perinatal deaths were reported to the region. In line with this, deaths were from Adama town(9),West Hararge (9),Asela town(5),Horo Guduru(4),North Showa(4),Jima town (3), Sheger City(3),South West Showa(3),West Showa(3),Borana (2), East Showa (2),Illubabor (2),Jima (2),West Arsi (2) and the following zone/town reported (1) case from Arsi,Batu town,East Bale,East Borana,Guji,Holota town,Kellem Wollega, towns of Nekemte and Woliso .

2.12 Cholera

In this week, a total of 249 Cholera cases with five deaths from Bale(2) and West Guji(3)were reported to the Region. The cases were reported from Bale(81),Arsi (54),West Guji (43),Sheger city (34),East Showa(23),East Bale(11) and West Arsi(3).

2.13 Dracunculiasis (Guinea Worm)

Zero cases of suspected guinea worm were reported to the region this week.

2.14 Scabies

In this week, 780 scabies cases with no admission were reported to the region. The highest number of cases were reported from South West Showa 135(17%),Jimma 89(11%),West Guji 69(9%), West Showa 67(9%)& Arsi 39(5%).

2.16 COVID-19

This week, zero case of COVID-19 was reported to the region.

2.17 Other Cases

In this week, there were a total of 53 other cases and conditions were reported to the region other than the IDSR report. Of these 50 Dog & animal bites including 1 case of chicken pox and 2 all other causes of morbidity. In this week, 89 newly identified human immuno virus(HIV) cases were reported to the Region, of which 21 were recent infections and 64 of them were enrolled to the ART clinic. Of 89 identified HIV cases ,reports as enrolled to ART were received from Adama town (8),East Borana ,Guji and West Showa(7) cases each, Nekemte town (6),Bishoftu town (5),Sheger City (5),East Showa (4),West Guji(3) including (2) cases per zone/town of Holota town,Jima town ,Moyale town,Robe town& additionally,(1)from Ambo town,Borana,Horor Guduru and Shashamane town.

2.18 Response Activities

- ✓ To contain the current cholera outbreak, strengthened surveillance, case management, and all necessary measures are undertaken at all levels to prevent and control the outbreak.Based on weekly surveillance reports, feedback is usually given to all zones and towns as time as possible
- ✓ Health and nutrition task force meeting is held every two weeks and sometimes every month
- ✓ On the basis of the COVID-19 pandemic, rumors received from any source, verified and risks are communicated as early as possible.
- ✓ The Regional emergency operation center(EOC) was activated and “Free toll” 6955 is uninterruptedly working daily
- ✓ Professionals were assigned to receive free calls from the public and rumors received are investigated and responded
- ✓ Isolation of suspected cases & investigation for (COVID-19) are ongoing to protect the public from being infected. Testing and contact tracing are also conducted as routine activities.
- ✓ Information dissemination on the prevention of COVID-19 is continually undergoing in all areas in the region.
- ✓ Community-based surveillance was initiated for COVID-19 and hence HEWs carry out awareness-creation activities and report individuals suspected of COVID-19 to responsible authorities.

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9.1.3 Epidemiological WHO Week 40, 2023

Highlights of week 40,2023

- ➔ Both Regional surveillance report completeness and timeliness were 89% in this week.
- ➔ Confirmed Malaria cases increased by 6,111 (18%) as compared to WHO week 39.
- ➔ Suspected Measles cases decreased by 19 (11%) & SAM cases increased by 365 (11%) as compared to week 39.
- ➔ Zero **COVID-19** case report received in this week.

INTRODUCTION

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completeness, trends of priority diseases, and response activities.It also provides feedback on surveillance activities for WHO week 40, 2023.

1. Weekly Surveillance Reporting status

This week, both completeness and timeliness of reports received from government health facilities in Oromia region were 89%. Most of the zones and towns reported above the expected target. Below target reported were, Horo Guduru Wollega (76%),East Borena (74%),West Wollega (70%),North Showa(48%) and East Wollega(64%). All Zones and Towns submitted the report.

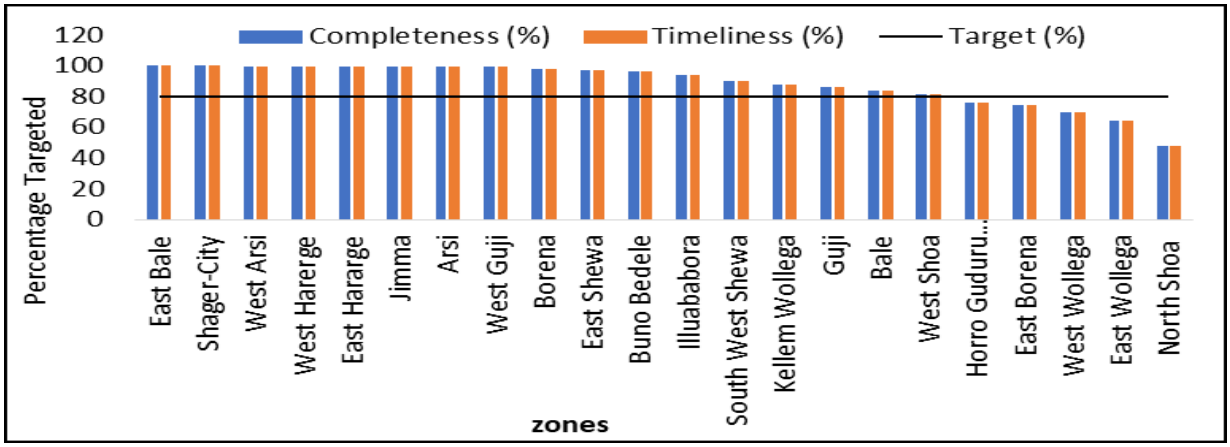

Figure 1: Report completeness and timeliness by zones, Oromia, WHO week 40, 2023

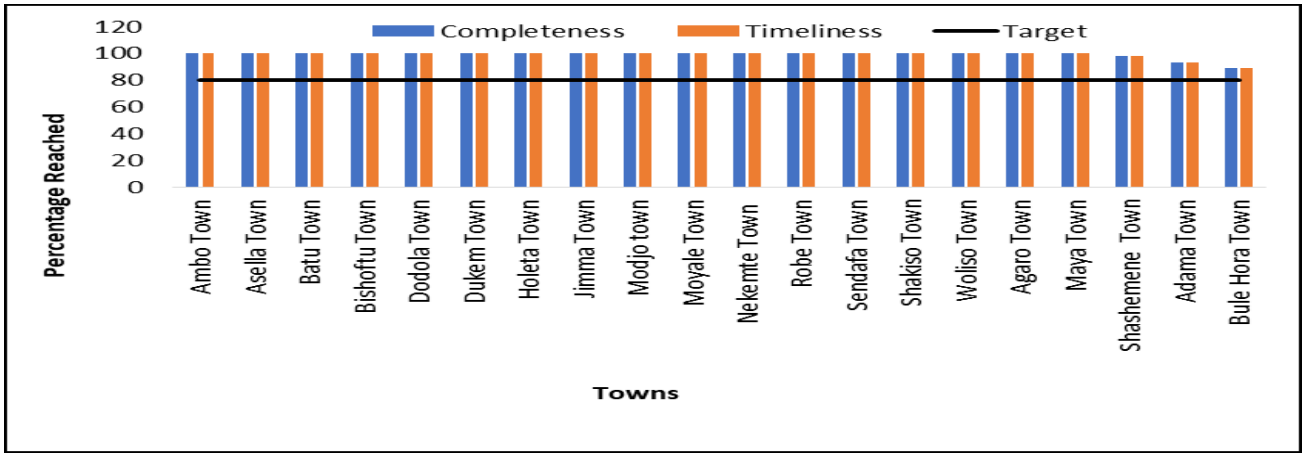

Figure 2: Report completeness and timeliness by towns, Oromia, WHO week 40, 2023

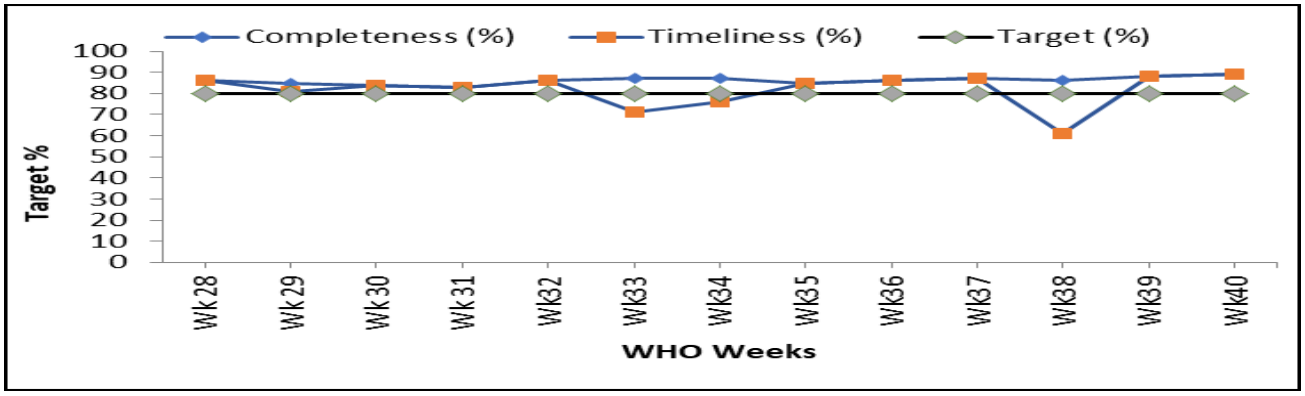

Figure 3: Trends of Regional surveillance report Timeliness and Completeness, WHO Week 28-40, 2023

2. Diseases or Conditions

2.1 Malaria

In this week, a total of 103907 febrile cases were tested by laboratory of which 41014 were positive with a positivity rate of 40%. Of the total confirmed malaria cases reported, 26090 (64%) of them were plasmodium falciparum cases. A total of 6 deaths were reported from Jimma (1) ,Kellem Wollega (4)& West Wollega (1). 1528(4%) of positive malaria cases were treated as inpatients. The highest number of cases were from West Wollega 13655 (33%), Kellem Wollega 8570(21%), Jimma 4659 (11%),East Wollega 2682(7%), Illubabor 2104(5%),East Shewa 1395 (3%) and Buno Bedele 1171(3%).

Table 1: Zones and districts reported high malaria cases, Oromia Region, WHO Week 40, 2023

Zones & District	Laboratory Examined	PF +PV	SPR	%from region/ zone
West Wollega	22873	13655	60	33
Babo Gambel	2528	1570	62	11
Kondala	1587	1367	86	10

Boji Chokorsa	1636	1198	73	9
Begi	1599	1132	71	8
Nejo	1962	1059	54	8
Kellem Wollega	14860	8570	58	21
Dale Sadi	3414	2278	67	27
Lalo Kile	1435	1159	81	14
Jimma	12285	4659	38	11
Seka Chokorsa	2660	1539	58	33
Shabe	2486	1290	52	28
East Wollega	6784	2682	40	7
Sasiga	1313	607	46	23
Guto Gida	1180	578	49	22
Jimma Arjoo	721	364	50	14
Illuababora	5064	2104	42	5
Darimu	1856	1074	58	51
East Shewa	5425	1395	26	3
Adamitulu Jido kombolichaa	711	280	39	20
Meki Town	997	274	27	20
Buno Bedele	3500	1171	33	3
Chewaka	1396	595	43	51
West Arsi	2999	1119	37	3
Shalla	736	409	56	37
Negelle Arsi ®	403	139	34	12

Confirmed Malaria cases Increased by 6,111 (18%) as compared to week 39.

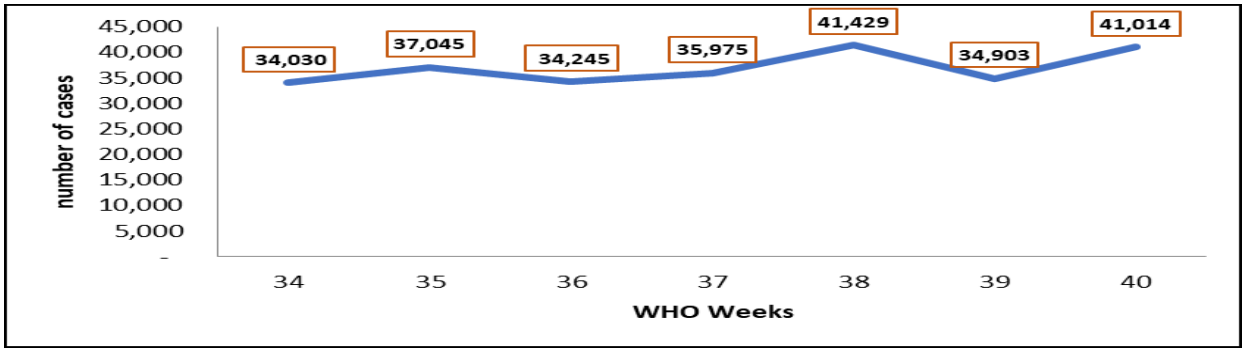

Figure 4: Trends of weekly confirmed malaria cases, Oromia Region, WHO Weeks 34-40, 2023

2.2 **Dysentery**

In this week, a total of 2940 dysentery cases were reported to the region with 11 admissions and zero death. The number of cases increased this week by 83(3%) compared to week 39. The highest number of cases were reported from East Hararge 218(7.4%),Arsi 215(7.3%),West Hararge 207(7%),Sheger city 205(7%) and Jimma 201(6.8%).

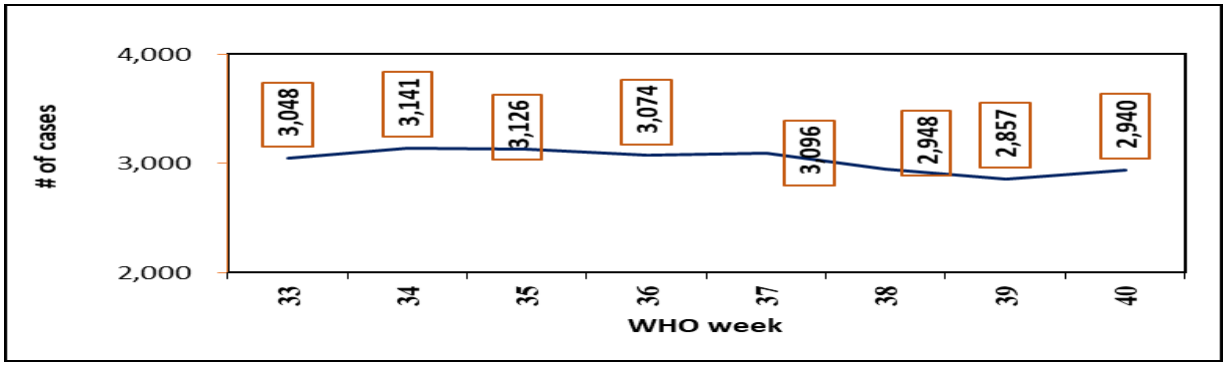

Figure 5: Trends of dysentery cases, Oromia Region, WHO Weeks 33- 40, 2023.

2.3 Measles

This week, a total of 150 suspected measles cases with zero deaths reported to the region . The numbers of case decreased by 19 (11%) as compared to week 39. The highest number of measles cases were from West Hararge (15),East Hararge (13),Buno Bedele(13),Kelem Wollega (12),West Arsi(12) and Arsi Zone (9).

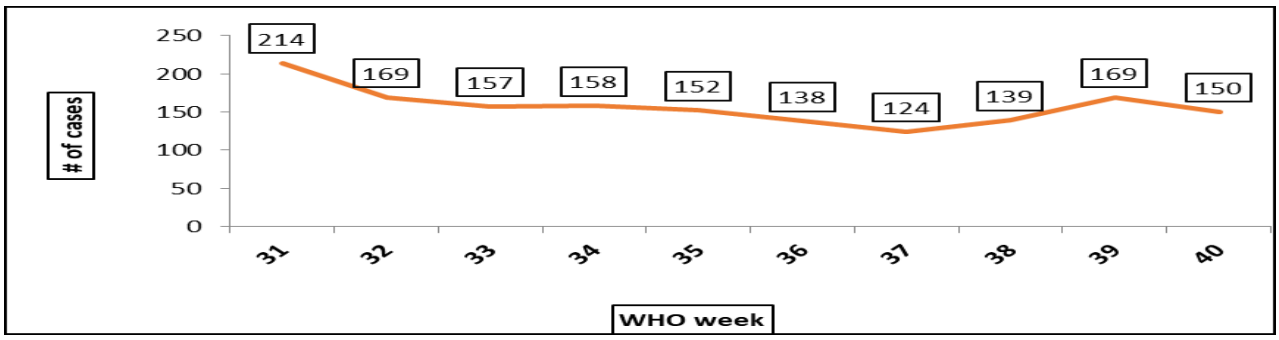

Figure 6: Trends of measles cases, Oromia Region, WHO Weeks 31-40, 2023

2.4 Acute Flaccid Paralysis (AFP)

In this week, 3 AFP cases were reported to the region from Illuababora (1), West Hararge (1) and West Shoa (1).

2.5 NNT

In this week, One case was reported to the region from West Guji zone.

2.6 Malnutrition

In this week, new 3822 Severe Acute Malnutrition (SAM) cases with 573(15%) cases admitted to SC were reported to the region with four deaths from Guji(1), Illuababora, (1), South west shewa (1), and West Shewa(1) .The highest number of cases were reported from West Hararge 510(17%), West Arsi 372(13%), Arsi 239(8%),West Guji 205(7%),Jimma 203(7%) and Bale 188(6%).

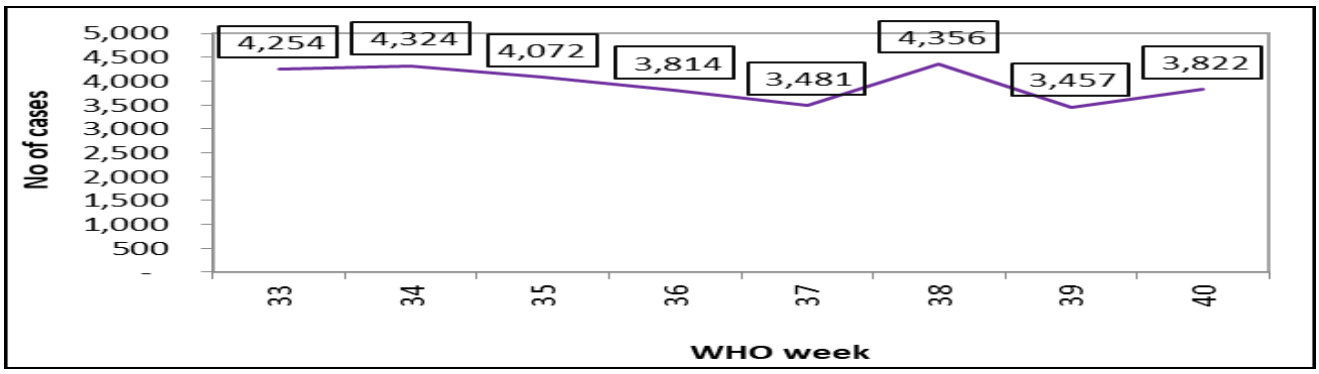

Figure 7: Trends of malnutrition cases, Oromia Region, WHO Weeks 33-40, 2023

2.7 Meningococcal Meningitis

In this week, a total of 66 suspected meningococcal meningitis cases, & 53 admissions with two deaths from West Showa and west Hararge were reported to the region. The highest number of cases were reported from West Shewa (11), East Hararge (9), West Hararge(7),North Shoa(6),Dodola town(5),Robe town (4) & Waliso town (4).

2.8 Anthrax

In this week, zero case of Anthrax was reported to the region.

2.9 Relapsing Fever

This week, a total of 6 relapsing fever cases with no death were reported to the region from Nekemte town(3) and Arsi Zone(3).

2.10 Cholera

In this week, a total of 102 Cholera cases with zero death were reported to the Region. The cases were reported from West Guji (82), Sheger-city(7), Maya town(6),Dodola town(3),Shashemene Town (2), West Arsi(1) and Bale(1).

2.11 Maternal deaths

In this week, 12 maternal deaths were notified to the Region. The report was received from Kellem Wollega (3),East Hararge (2), East Borena(1), East Wollega (1), Horo Guduru Wollega (1), West Hararge (1), East Bale (1), Shashemene town (1) and West Shewa(1).

2.12 Perinatal death

In this week, 56 perinatal deaths were reported to the region. These deaths were from Illubabor (8),West Shewa (6), Jimma Town (6), Adama Town (4), Asella Town (3), Nekemte Town (3), East Showa (3), South West Shewa (3), East Hararge (2),Horo Guduru Wollega (2), Kellem Wollega (2), Guji (1), (2),Sheger-city (1), Jimma (1),Borena (1).

2.13 Dracunculiasis (Guinea Worm)

Zero cases of suspected guinea worm were reported to the region this week.

2.14 Scabies

In this week, 763 scabies cases with 13 admissions were reported to the region. The highest number of cases was reported from South West Shewa 132(17%), Jimma 77 (10%), West Showa 67(9%), West Arsi 46(6%), West Guji 40(5%) and Guji 39 (5%)

2.15 COVID-19

This week, zero case of COVID-19 was reported to the region.

2.16 Other Cases

In this week, there were a total of 85 other cases and conditions were reported to the region other than the IDSR report. Of these Dengue fever (15), 62 Dog & animal bites with(1) case of Snake bite. In addition, 70 newly identified HIV cases were reported to the Region, of which 12 were recent infections and 60 of them were enrolled to the ART clinic. Of 70 newly identified HIV cases, reported were from East Shewa (11),Adama town(10), Jimma town (8),North Shewa (6), Guji (6), Nekemte town (5), West Shewa (4) and West Guji (3).

2.17 Response Activities

- ✓ To contain the current cholera outbreak, strengthened surveillance, case management, and all necessary measures are undertaken at all levels to prevent and control the outbreak
- ✓ Based on weekly surveillance reports, feedback is usually given to all zones and towns as timely as possible.
- ✓ Health and nutrition task force meeting is held every two weeks and sometimes every month.

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LISTS OF APPENDIXES

Annex I:Questionaries on prevalence and determinants of uncontrolled hypertension

Questionnaire (English)

Questionnaire identification number _____

Part I: Socio demographic characteristics

This section is about socio-demographic characteristics of the respondent. Tick (√) or circle on the responses of respondents from the given alternatives.

General Information	
Code No	1. ------- 2. … 3. …. 4……
Name of health facility	
Name of data collector	
Date of data collection	
Starting time	
Finishing time	

Part I. Socio-demographic Characteristics of the patients.		
No	Question	Responses
1	Sex	1. Male 2. Female
2	Age	_____year
3	Ethnicity	1. Oromo 2. Amhara 3. Tigre 4. Guraghe 5. Others specify --------
4	Religion	1. Muslim 2. Orthodox 3. Protestant 4. Catholic 5. Others specify _____
5	marital status	1. Single 2. Married 3.Divorced 4. Widowed
6	educational level	1. No formal education 2. Primary education (1–8 grade) 3. Secondary education (9–12grade) 4. College and above
7	Occupation	1. Farmer 2. Civil servant 3. Merchant 4. Housewife 5. Other specify_____
8	Residence	1. Urban 2. Rural
9	Monthly income	_____ETB
10	Family history of hypertension	1. Yes 2. No

Part II: Clinical characteristics of patients

This section is about the general health condition of the respondent. Pose the questions to the respondent and fill the given answer on the space provided or tick (√) on the responses from the given alternatives.

Clinical characteristics of patients			
S.no	Ques ion	Response	Skip
1	Do you have a first-degree family history of Hypertension?	1. Yes 2. No	
2	How long has it been since you were diagnosed with hypertension?	----------months	
3	How long have you been taking anti Hypertensive medications?	_____Months	
4	What is your frequency of follow up at this hospital?	1. Weekly 2. Every two week 3. Every month 4. Every two month 5. Every three month 6. Every six month 7. Other (specify) -------	
5	How often do you measure your blood Pressure?	1. Daily 2. Weekly 3. Every two week 4. Every month 5. Every two month 6. Every three month 7. Every six month 8. Other (specify) -------	
6	Do you have any of the following disease?	1. No comorbidities 2. Diabetes mellitus 3. CKD 4. Stroke 5. Coronary artery disease 6. Others (specify) -----	
7	Do you think that uncontrolled BP can lead to harm on your health?	1. Yes 2. No	

8	If your answer is "yes" for question No. 7,which conditions can be caused by Uncontrolled BP?	1. Stroke 2. Coronary artery disease 3. CKD 4. Others (specify) -----	
9	Do you bother about the long-term treatment provided to you?	1. Yes 2. No	
10	Do you have weight loss compared to pre Diagnosis weight?	1. Yes 2. No	
11	If your answer is "yes" to question No. 10, how much weight loss do you have?	____ (kg)	
12	Weight	____ (kg)	
13	Height	____ (cm)	
14	Waist circumference	____(cm)	
15	Blood pressure measurement (today)	____(mmHg)	
16	Do you have your own BP monitoring device?	1. Yes 2. No	

Part III: Dietary adherence and other behavioral practices

This part of the questionnaire is about the behavioral practices of the patient. Put circle/tick (√) on the responses of the respondent from the given alternatives.

1. Diet adherence related questions			
S.no	Quest on	Response	Skip
1.1	How often do you include grains (like, barley, wheat, millet,…) in your diet?	1. More than three times per day 2. Two-three times per day 3. Once a day 4. Four-six times per week 5. Two-three times per week 6. Once a week 7. Never	
1.2	How often do you include green leafy vegetables (like, cabbage, lettuce, spinach,) in your diet?	1. More than three times per day 2. Two – three times per day 3. Once a day 4. Four - six times per week 5. Two – three times per week 6. Once a week 7. Never	
1.3	How often do you include other vegetables (like, carrot,	1. More than three times per day	

	tomato, onion…) in your diet?	2. Two – three times per day 3. Once a day 4. Four – six times per week 5. Two – three times per week 6. Once a week 7. Never	
1.4	How often do you include fruits (like, banana, mango, apple, …) in your diet?	1. More than three times per day 2. Two – three times per day 3. Once a day 4. Four – six times per week 5. Two – three times per week 6. Once a week 7. Never	
1.5	How often do you include saturated fat (like, mutton fat, egg butter, milk, cheese, ice cream …) in your diet?	1. More than three times per day 2. Two – three times per day 3. Once a day 4. Four – six times per week 5. Two – three times per week 6. Once a week 7. Never	
1.6	How often do you include lean meats (like, poultry, chicken egg, fish,…) in your diet?	1. More than three time per day 2. Two – three times per day 3. Once a day 4. Four – six times per week 5. Two – three times per week 6. Once a week 7. Never	
1.7	How often do you take sweet meals (like, sugar, Chocolate, …)?	1. More than three times per day 2. Two – three times per day 3. Once a day 4. Four - six times per week 5. Two – three times per week 6. Once a week 7. Never	
1.8	How often do you take coffee?	1. More than three times per day 2. Two – three times per day 3. Once a day 4. Four - six times per week 5. Two – three times per week 6. Once a week	

		7. Never	
1.9	How do you describe your salt intake?	1. Totally avoid 2. Reduced in amount compared to pre-diagnosis use 3. Use the same amount as before 4. Not known	
1.10	How often do you eat out of the house (such as wedding, party, family function etc.)?	1. Never 2. Less than once a month 3. One – two times per month 4. Three – four times per month 5. Two – three times a week 6. Four – six times a week 7. Daily	
2. Adherence to alcohol intake			
2.1	Do you drink alcohol?	1. Yes 2. No	
2.2	If your answer to question No. 2.1, is yes, which type of drink do you take?	1. Wine 2. Beer 3. Local drinks 4. Others (specify)	
2.3	How much drink do you take per day?	1. Less than one standard drink 2. One standard drink 3. Two –four standard drink 4. Five – six standard drink 5. Seven – eight standard drink 6. More than eight standard drink	
2.4	How often do you drink per week?	1. Daily 2. Six days per week 3. Four – five days per week 4. Two – three days per week 5. Once a week	
3. Adherence to cessation of smoking			
3.1	Do you smoke cigarettes?	1. Yes 2. No	
3.2	If your answer to question No. "3.1", is yes, how often do you smoke?	1. More than six times per day 2. Four – six times per day 3. Two – three times per day 4. Once per day 5. Two –three times per week 6. Four – six times per week	

		7. Once per week	
4. Adherence to exercise			
4.1	Do you perform physical exercise?	1. Yes 2. No	
4.2	If your answer to question No. "4.1" is yes, how often do you perform exercise?	1. Less than once per week 2. One – two days per week 3. Three – four days per week 4. Five – six days per week 5. Daily 6. Two times per day 7. More than two times per day	
4.3	For how long do you perform per session?	1. Less than 30 minutes 2. 30 minutes or above	
5. Medication adherence related questions			
S.no	Question	Yes	No
5.1	Do you sometimes forget to take your pills?		
5.2	People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?		

5.3	Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?		
5.4	When you travel or leave home, do you sometimes forget to bring along your medicine?		
5.5	Did you take all your medicine yesterday?		
5.6	When you feel like your symptoms are under control, do you sometimes stop taking your medicine?		
5.7	Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?		
5.8	How often do you have difficulty remembering to take all your medicine? A. Never/rarely B. Once in a while C. Sometimes D. usually E. all the time		

I.Data abstraction format

6.Medications						
6.1 Antihypertensive medications						
	Initial antihypertensive drugs			Current antihypertensive drugs		
	Drugs	Dose	Frequency	Drugs	Dose	Frequency
	1.HCT			1.HCT		
	2.Nifedipine			2.Nifedipine		
	3.Enalapril			3.Enalapril		
	4.Captopril			4.Captopril		

	5.Atenolol			5.Atenolol		
	6.Amlodipine			6.Amlodipine		
	7.Carvedilol			7.Carvedilol		
	8.Metoprolol			8.Metoprolol		
	9.Lisinopril			9.Lisinopril		
	10. Others _____			10. Others _____		

6.2	Medication/s for the comorbid condition/s				
	Drug/s	Comorbid condition/s	Dose	Frequency	Duration

7	BP measurement readings in three subsequent visits		
	Visits	BP reading	Date
	Visit -1		
	Visit -2		
	Last visit(Current BP)		

Annex II: Cholera Outbreak Investigation Questionnaires

Risk Factor Case-Control Study ENGLISH CASE QUESTIONNAIRE

Name of case. _____ *or* Name of control_____

We are working with the of Oromia Health Bureau and PHEM in Oromia to investigate the ongoing cholera outbreak. We are only collecting information necessary to better understand the cholera outbreak. Your responses to our questions will have no direct impact on you or your family but instead will help us better understand this outbreak and how to prevent cholera from spreading. You and your family are free to choose whether or not to participate in this investigation. You are also free to say no to any part of this investigation. There is no penalty if you or your family do not want to participate, and this will not affect the medical care you receive. Even if you agree to participate, you may change your mind at any time.

We are wondering if you would be willing to answer some questions. It will take about 30 minutes of your time.

Yes □ GO TO Q1

No □ Thank them, note on log sheet, and end interview.

Q	Question
	A. RESPONDENT INFORMATION
1	What is your relationship to the person with cholera? (CIRCLE ONE) Patient Spouse Parent Sibling 88. Other (*specify*) _____
	B. CASE PATIENT VERIFICATION
2	Since August 29th/ , 2023 have you (the patient) been sick with acute watery diarrhea? 1. Yes□ *go to Q3* 0. No □ End Questionnaire 99. Don't know □ End Questionnaire
3	Since August 28th 2023 was anyone else in your (the patient's) house sick with cholera (i.e. acute watery diarrhea) before you (the patient) (or your family member)? 1. Yes□ End Questionnaire 0. No □*go to Q4* 99. Don't know □ End Questionnaire
4	On the day you were most ill, how many stools did you have in a 24-hour period? *(DO NOT READ, CIRCLE ONE)* 1.Less than 3 stools/day□ End Questionnaire 2.Equal or more than 3 stools/day□ go to Q5
5	Have you received IV fluids (drip) during your admission? (*CHECK IF PATIENT HAS/HAD AN I.V.)* 1. Yes □ go to Q6 0. No □ End Questionnaire
6	Date of first watery diarrhea (dd/mm/y): ____/____/2015/16 E.C

7	In the 5 days before you had diarrhea, did you travel outside haramaya woreda for the entire 5 days? 1. Yes 0. No 99. Don't know *If yes* □ End Questionnaire *If no*□*go to Q8*
8	Date admitted to hospital (dd/mm/yyyy): ____/___/2015/16 E.C
9	How long did it take you to reach the health facility? _____ hours _____ minutes
10	Have you had any of the following additional symptoms during your diarrheal illness? (Read each symptom and record response) ___Vomiting ___Fever ___Leg cramps ___Nausea ___Loss of consciousness ___Other
C. CASE IDENTIFYING INFORMATION	
11	Patient first name: Last name:
12	Age: _____(years)

13	Sex 1. Male 2. Female
14	What was the patient's place of residence in the 5 days before illness began? Patient's address __ 2.Phone----------3.Area/section----------4.Gps
15	How many people live in your (the patient's) household (eat from the same pot)? _____ *(number of persons, including patient)* 99. Don't know
16	How many people live under your (the patient's) roof (your house)? _____ *(number of persons, including patient)* 99. Don't know
17	How many people live in your (the patient's) compound? _____ *(number of persons, including patient)* 2. Not applicable 99. Don't know
18	What was the last year of school you (the patient) completed?*(CIRCLE ONE)* None Some primary school Completed primary school Some secondary school Completed secondary school Any trade school/university (tertiary level) 88. Other (*specify*) _____
19	What do you (the patient) do for a living?*(CIRCLE ONE)* Student 2.Child (not in school) 3.Farmer 4.Fisherman 5.Trader Maid 6.Street food vendor 7.Teacher 8.Unemployed 9.Health Care Worker 88. Other(specify) _____
20	Does your (the patient's) household own any of the following items? *(ANSWER EACH QUESTION, CHECK ALL THAT APPLY* _____) 1. Yes 0. No 99. Don't know

Radio	□	□	□
Motorcycle	□□	□	□□
Car	□□	□□	□□
Electricity	□□	□□	□□
Mobile telephone	□□	□□	□□
Television	□□	□□	□□

D. EXPOSURES	
21	In the 5 days before you had diarrhea, were you in contact with anyone with cholera (acute watery diarrhea)? 1. Yes 0. No 99. Don't know
22	In the 5 days before you had diarrhea, did you go to a funeral? 1. Yes 0. No 99. Don't know *If yes, go to Q23 If no, skip to Q26*

23	*If YES,* did you help prepare the body?1. Yes 0. No 99. Don't know
24	*If YES,* Did you eat any food or drink at the funeral? 1. Yes 0. No 99. Don't know
25	*If YES,* Did this person die from cholera (acute watery diarrhea)? 1. Yes 0. No 99. Don't know
26	In the 5 days before you had diarrhea, did you go to any wedding or social gathering (church, mosque etc)? 1. Yes 0. No 99. Don't know *If yes, go to Q27 If no, skip to Q28 (section E)*
27	*If YES, Did you eat any food or drink at the gathering?* 1. Yes 0. No 99. Don't know

E. WATER EXPOSURES	
28	In the 5 days before you had diarrhea, what water sources did you drink from (Probe: while at home, at work, at school, away from home)? *(DO NOT READ, CIRCLE ALL THAT APPLY)* Piped into dwelling/plot Public tap (tap water) Open well Covered well Borehole/hand pump Spring River or stream Lake or pond Rainwater Bottled water Packet water (Brand_____) Local water bags 88. Other (specify)_____ 99. Don't know
29	In the 5 days before you had diarrhea, did you drink any untreated/unsafe water? 1. Yes 0. No 99. Don't know *If YES, go to Q.30 If NO, skip to Q.31*
30	*If YES, from what source?* *(DO NOT READ, CIRCLE ALL THAT APPLY)* Piped into dwelling/plot Public tap (tap water) Open well Covered well Borehole/hand pump Spring

	River or stream Lake or pond Rainwater Bottled water Packet water (Brand_____) Local water bag 88. Other (specify)_____99. Don't know
31	In the 5 days before you had diarrhea, did you or your family do anything to make your drinking water safe at home? 1. Yes 0. No 99. Don't know *If yes, go to Q32 If no, skip to Q35 (section F)*
32	*If YES*, what have you been doing to make your drinking water safe at home? *(DO NOT READ, CIRCLE ALL THAT APPLY)* 1.Boiling 2.Chlorination product (Klorin/Aquatab) 3. Filter (specify type _____) 88. Other (specify)_____ 99. Don't know
33	In the 5 days before you had diarrhea, how often did you or your family make your drinking water safe at home? 1. Daily 2.Every 2-3 days 3.Once in the five days 88. Other (specify)_____99. Don't know:

F: FOOD EXPOSURES

35. Category 1: Food staples

In the 5 days before you had diarrhea, did you eat any of the following food items? *(ANSWER EACH QUESTION)*

	1. Yes	0. No	99. Don't know
Bread, Injera	☐☐	☐☐	☐
Cabbage	☐☐	☐☐	☐☐
Potato	☐☐	☐☐	☐☐
(porridge, yam and potatoes)	☐	☐	☐
Did you eat any freshly made, hot porridge, bread?	☐☐	☐☐	☐☐
Did you eat cold leftover porridge?	☐☐	☐☐	☐☐
Did you eat cold leftover porridge that was reheated?	☐☐	☐☐	☐☐
Rice	☐	☐	☐
Did you eat any freshly made, hot rice?	☐☐	☐☐	☐☐
Did you eat cold leftover rice?	☐☐	☐☐	☐☐
Did you eat cold leftover rice that was reheated?	☐☐	☐☐	☐☐

36. Category 2: Meat, Fish and Dairy

In the 5 days before you had diarrhea, did you eat any of the food items? *(ANSWER EACH QUESTION)* following

	1. Yes	0. No	99. Don't know
Chicken	☐	☐	☐

Pork	☐	☐	☐
Goat	☐	☐	☐
Beef (cow meat)	☐	☐	☐
Fish *If YES*, was it cooked? *If YES, was it smoked?*	☐☐ ☐☐ ☐☐	☐☐ ☐☐ ☐☐	☐☐ ☐☐ ☐☐
Milk *If YES, was it cow milk?* *If YES, was it powdered milk?*	☐☐ ☐☐	☐☐ ☐☐	☐☐ ☐☐

37. Category 4: Vegetables and leaves

In the 5 days before you had diarrhea, did you eat any of the following food items? *(ANSWER EACH QUESTION)*

	1. Yes	0. No	99. Don't know
Potato ☐e☐ves	☐	☐	☐
Khat leaves	☐	☐	☐
Bitter leaves	☐	☐	☐
Beans	☐	☐	☐
Sugarcane	☐	☐	☐

38. Category 5: Fruits

In the 5 days before you had diarrhea, did you eat any of the following food items? *(ANSWER EACH QUESTION)*

	1. Yes	0. No	99. Don't know
Oranges	☐	☐	☐
Mangoes	☐	☐	☐
Tomatoes	☐	☐	☐
Banana	☐	☐	☐

39. CCategory 6: Drinks and alcohol

In the 5 days before you had diarrhea, did you eat any of the following food items? *(ANSWER EACH QUESTI*

1. Yes 0. No 99. Don't know

Tea	☐	☐	☐
Any alcohol in the 5 days before you became ill with watery diarrhea	☐	☐	☐

40	In the 5 days before you had diarrhea, did you eat any food, drinks or water purchased from a street vendor? 1. YES (specify where: ____ 0. No 99. Don't know *If YES, did you eat any of the following at a street vendor?* __

	1. Yes	0. No	99. Don't know
Water	☐	☐	☐
Rice	☐	☐	☐
Any Soup	☐	☐	☐
Sliced fruit	☐	☐	☐
Other: (please specify: ☐ _____)			

If YES, between _____ and _____ how often did you eat at a street vendor?

More than once a day

Once a day

2-3 times a week

Once in the 5 days 88. Other (specify_____) 99. Don't know

	G. KNOWLEDGE, ATTITUDES AND PRACTICES
41	Before you came to the health facility, did you receive any information about cholera? 1. Yes 0. No 99. Don't know *If yes, go to Q43 If no, skip to Q46*
42	*If YES,* how did you receive that information? *(Do not read, CIRCLE ALL THAT APPLY)* Radio Television SMS Newspaper Flyer/brochure/poster Community meeting Hospital staff Community health worker Friend Family member 88. Other (specify) _____ 99. Don't know

43	*If YES,* when did you receive information about cholera? 1 week ago 2-3 weeks ago 1 month ago More than 1 month ago 88. Other (specify) _____ 99. Don't know
44	*If YES,* how often have you received education about cholera? Daily 2-3 days per week Once per week Once per 2 weeks Once per month 88. Other (specify) _____ 99. Don't know
45	Have you received any health education from this health facility during this admission? 1. Yes 0. No 99. Don't know *If yes, go to Q47* *If no, skip to Q48*
46	If YES, on what topics? *(Do not read, CIRCLE ALL THAT APPLY)* How you can prevent yourself from getting cholera How cholera is spread Water treatment Hand hygiene 88. Other (specify) 99. Don't know
47	What do you remember most about the messages you've received (this includes messages both before and after you were admitted)? (Do not read, circle all that apply) Wash your hands using soap and safe water Drink ORS of SSS if you have diarrhea Use latrines or bury feces Go to a clinic immediately If you have severe watery diarrhea/cholera Don't defecate in an open field, in/near a body of water Cook food well, keep it covered, eat it hot and peel fruits and vegetables 88. Other (specify) 99. Don't know
48	How do you get cholera? (Do not read, circle ALL THAT APPLY) By drinking contaminated water By eating contaminated food Burial preparation By not washing hands Caring for people that are ill with cholera From the air Flies and insects Shaking hands From a dirty environment 88. Other (specify) _____99. Don't know

49	Can you tell me the symptoms of cholera? (Do not read, circle ALL THAT APPLY) 1. Watery diarrhea 2.Bloody diarrhea 3.Vomiting 4.Fever 5.Dehydration 6.Poor appetite 7.Fatigue 8.Cough 88. Other(specify)___99. Don't know
50	Please name ways to prevent cholera (*DO NOT READ, CIRCLE ALL THAT APPLY)* Wash your hands Drink treated water Eat properly heated food Disinfect house with chlorine Take an antibiotic pill Cholera cannot be prevented 88. Other (specify)_____ 99. Don't know
51	What should you do with the body of someone that died of cholera? (*DO NOT READ, CIRCLE ALL THAT APPLY*) Immediately bury the body 2.Wash hands with soap and safe water after handling the body 88. Other (specify) 99. Don't know
52	What should you do if you have cholera (*DO NOT READ, CIRCLE ALL THAT APPLY)* Drink oral rehydration solution Go to a health facility Go to a traditional healer Take an antibiotic Cholera cannot be treated 88. Other (specify)_____99. Don't know
53	Since June 23rd, did you receive any products for the prevention or treatment of cholera before you were admitted to the CTU? 1. Yes 0. No 99. Don't know *If yes, go to Q58 If no, skip to Q62*
54	If YES, what products? *(Do not read, CIRCLE ALL THAT APPLY)* Chlorine products ORS Soap 88. Other (specify)_____99. Don't know
55	If YES, who did you receive these products from? *(Do not read, CIRCLE ALL THAT APPLY)* Community health worker Health facility NGO 88. Other (specify) 99. Don't know
56	If YES, how often have you received these products? Daily 2-3 days per week Once per week Once per 2 weeks

	Once per month 88. Other (specify) 99. Do not know
57	If YES, were these products free? 1.Yes 0. No 99. Don't know
58	Do you know what ORS is? 1. Yes 0. No 99. Don't know *If yes, go to Q63 If no, skip to Q67*
59	Do you know how to prepare ORS? 1. Yes 0. No 99. Don't know *If yes, go to Q66 If no, skip to Q67*
60	If YES, how do you prepare it?

	1. Yes	0. No	99. Don't know	Quantity used *(estimate amount)*
ORS Sachet	☐	☐	☐	*(number of sachets)*
Water	☐	☐	☐	*(estimate in liters)*

61	When do you usually wash your hands with soap? *(Do not read. Check all that are mentioned. If the response is, "When they are dirty," probe to determine when hands become dirty.)* Before preparing food or cooking Before eating Before feeding children After cleaning/changing baby After contact with a sick person After using the toilet Do not wash hands with soap 88. Other (specify) _____ 99. Don't know

Thank you for your participation!

THIS SECTION IS TO BE FILLED OUT BY THE PERSON PERFORMING THE WATER TESTING AT THE PATIENT'S HOUSE

H. HOUSEHOLD OBSERVATIONS	
House GPS coordinates N:_____ W:_____	
62	*What type of roofing does this household have (CIRCLE ONE)?* Thatch Metal/iron sheet Tile/asbestos sheets Wood

	Cement 88. Other: _____
63	*What type of flooring does this household have (CIRCLE ONE)?* Mud Metal/iron sheet Wood Cement Tile/linoleum 88. Other: _____
64	*What type of material is used for the walls (CIRCLE ONE)?* Mud Metal Wood Cement/plaster Bricks/blocks/stones 88. Other: _____
65	"Can you please show me where your drinking water is stored at home?" 1. Drinking water stored 0. No drinking water stored
66	*What type of drinking storage container is it?(CIRCLE ONE)* Bucket Jerry can (plastic container with narrow mouth) Clay pot Drum (wide mouth) Plastic drinking water bottle 88. Other _____
67	*Observation: Does the storage container have (circle):* Tap Yes No Cover Yes No
68	Can you please show me how you obtain water from the storage container? *Make observation on how water is obtained from the storage container 1.*Pours water out 2.Uses a tap 3.Uses a cup (or similar utensil) and dips in the water 88. Other (specify)_____
69	*Test chlorine in drinking water (CIRCLE ONE)* 1. Positive for chlorine 0. Negative for chlorine

70	"Do you have any products used to make your drinking water safe at home?" 1. Yes 0. No *If yes, go to Q77 If no, skip to Q78*

71	If YES, could you please show it to me? 1. Has 0. Doesn't have Make a note of product name: _____	
72	Is there ORS in house? 1. Yes 0. No *If yes, go to Q79 If no, skip to Q80*	
73	If YES, could you please show it to me? 1. Has 0. Doesn't have	
74	Is there soap for hand-washing in the house? 1. Yes 0. No *If yes, go to Q81 If no, skip to Q21*	
75	If YES, could you please show it to me? 1. Has 0. Doesn't have	
76	Can you show me how you wash your hands? (*RECORD ALL OBSERVATIONS THAT APPLY)* Uses soap Makes lather Use towel to dry Air dry Wipe hands on clothes Uses only water (No soap) 0. Not able to demonstrate	
77	*Observations:* Is there a pitcher or cup to pour water for washing hands? 1. Yes 0. No If inside, is there a basin for catching water? 1. Yes 0. No	
78	"Can you show me where you most often defecate?" *(CIRCLE ALL THAT APPLY)* Flush toilet Pour flush toilet/latrine Pit latrine Bucket latrine (where feces are manually removed) Hole in the ground Open defecation (no facilities, bush, or field) 88. Other (specify) _____	
79	*How far away is the latrine/defecation area from the house (ESTIMATE DISTANCE)* _____metres	
80	Do you share your latrine with other houses? 1. Yes 0. No 99. Don't know	
81	"How many people share the latrine?"*(RECORD NUMBER OF PERSON _____(no. of persons)*	
82	"Today, where did you collect your drinking water for the household?"*(DO NOT READ, CIRCLE ALL THAT APPLY)*	
	1. Piped into dwelling/plot Public tap (tap water) Open well Covered well Borehole/hand pump Spring	River or stream Lake or pond Rainwater Bottled water Packet water Local water bags 88. Other (specify)_____99. Don't know

83	Water Source GPS coordinates N_____ W:_____

Annex III:Health profile description data collection tools (structured questioner) Negelle Arsi district, West Arsi zone, Oromia,Ethiopia

1. Historical Aspects of the area (Culture and tourism office)

1.1. District Name_____

1.2. How and why the name given_____

1.3. How and when the district was formed_____

1.4. Any other historical aspects of the district_____

2. Geography and Climate.

2.1. District map_____

2.2. Location (distance) _____direction) _____

2.3. Surface area of woreda_____ (_____%from the zone)

2.4. Altitude_____

2.5. Town _____rural_____ (land)

2.6. Geographical coordinate

Latitude_____longitude_____

2.7. Annual rainfall (average) _____, annual temp (average) _____

Climatic zones_____ (%) _____ (%)_____(%)

3. Political and Administrative Organization

Total number of kebeles: _____

Rural kebeles _____

Urban kebeles _____

4. Population and Population structures

4.1 Demographic data

Total population _____Male_____ Female _____sex ratio_____

1. Urban Total _____Male _____Female_____

2. Rural Total _____Male _____Female_____

3. Population under 1yrs_____

4. Population under five year's _____

5. Population<15years_____

6. Population>64years_____

7. Women15_49yearsofage_____

8. Total population by kebele (each kebele population)_____

9. Population enumerated by H.E.Ws_____

Table1: Population data by age and sex

Population data by age and sex								
Male	<1	1-4	5-10	11-24	25-34	35-49	50-64	>65

Female	<1	1-4	5-10	11-24	25-34	35-49	50-64	>65

4.2. Ethnicity/language

Oromo _____(_____%)Hadiya_____(_____%),

Amara_____(_____%)Kanbata_____(____%)

Tigre_____(_____%)Others_____(_____%)

4.3.Religion

Orthodox_____(_____%),Muslim_____(_____%),

Protestant_____(_____%)Other_____(_____%)

5. Economy (main stay of the economy, average income levels etc.)

5.1. Main income sources

Agriculture

Cultivated area _____

Grazing area _____

Cropping seasons _____

Livestock

Trourism

Trade

Other business

5.2. House hold income source

1. Agriculture_____

2. NGO----------

3. Government Employer_____

4. Private Employer_____

5. Daily Labourer_____

6. Different business_____

7. Jobless_____

5.3. Average Income_____

6. Education and school Health

6.1. Number of educational institution

1. K.G._____

2. Primarily School (1-8) _____

3. Secondary School (9-10) _____

4. Preparatory School (11-12) _____

5. College/University_____

6. TVET_____

7. Total School Age Children (target population)_____

8. Total Enrolment _____Male _____Female_____

School dropout in 6months or year 2023(2015E.C)_____

6.2. School health activities:

a) Water supply :Schools with water supply_____

: Schools without water supply_____

b) Latrine: schools with functional latrines_____

Male and female in separate wall: yes _____no_____

Hand washing facility with soap: yes _____no_____

Urinal facility for male students: yes _____no_____

Schools with anti HIV/AIDS clubs_____

Schools with primary eye care clubs_____

Schools with sanitation and hygiene clubs_____

7. Facilities

Accessibility (main roads) _____

Type of road_____

How many kebeles have access to transportation _____

Flow of transportation per day_____

How many people have access to fixed telephone? _____

How many people have access to mobile phone? (Coverage)_____

How many people get power supply_____?

Total no of kebeles: Rural _____Urban_____District boundaries

North_____South_____

East_____West_____

7.1. Infrastructure for health Facilities

Transportation: Health facilities with all-weather roads_____

Health facilities with seasonal roads_____

Health facilities without road accessibility_____

Telecommunication: Health facilities with fixed telephone_____

Health facilities with access to mobile phone_____

Health facilities with internet access_____

Power supply: Health facilities with 24 hours power supply _____

Health facilities with solar power supply _____

Health facilities with generator power supply _____

Water supply: Health facilities Electric power_____ (____ %), Water supply_____ (____ %)

How many of the health centres have access to:

Transportation_____ (____ %), Telecommunication_____ (____ %),

Electric power_____ (____ %), Water supply_____ (____ %)

with water supply in the premises(building)_____

How many of the health posts have access to:

Transportation_____ (____ %), Telecommunication_____ (____ %),

7.2. Safe water coverage

Kebeles getting safe water

a) Urban_____ (_____ %)

b) Rural_____ (_____ %)

Population getting safe water_____(_____%)

Table2: Main source of water

Types of available water point	Number	Kebeles it present
Treatment plant		
Hand dug well		
Shallow well		
Borrow well		
Medium spring		
Small spring		

Functionality of pipe line

a) Functional----------

b) Not Functional----------

c) Under construction----------

8. Disaster situation in the woreda

Was there any disaster (natural or manmade)in the woreda in the last one year?_____

Any recent disease outbreak/other public health emergency_____

If yes, cases_____ and deaths_____

9. Vital Statistics and Health Indicators

Infant Mortality Rate (IMR) _____ (total<1yrdeathsthis2004yr_____

Child Mortality Rate_____ this year's total<15yrdeaths_____

Crude Birth Rate_____

Crude Death Rate_____ totaldeaths2004yr____

Maternal Mortality Rate_____2013 total maternal deaths_____

Contraceptive Prevalence rate_____Contraceptive acceptance rate_____

ANC rate (how many of the total expected pregnancies attended 1st ANC----------

ANC rate (how many of the total expected pregnancies attended 4th ANC)----------

Percentage of deliveries attended by skilled birth attendants_____

Percentage of deliveries attended by HEWs_____

Percentage of deliveries attended by TBA_____

10. Health delivery system

10.1. District Health Structure

10.2. Health Facilities

Table3: Available Health Facilities in the woreda

Type		number	Total number of bed
Gov.t hospital			
Gov.t health canter	Type A		
	Type B		
	Type C		
Private health facilities	Clinic all type		
	Diagnostic lab		
	Drug stor		
	Pharmacy		
Gov.t Health post			
NGOs	Health post		
	Health centre		
	Hospital		
	Clinics		

Health institution to population ratio:

Hospital: Pop_____ HC: Pop_____

HP: Pop_____ Health service coverage_____%

Table4: Human resources for health sector

Types of Health professional	No.	Remark
Specialist		
G.P		
HO		
Nurses(Degree and Diploma)		
Midwife(Degree and Diploma		
Laboratory(Degree and Diploma		
Pharmacy(Degree and Diploma		
Environmental Health(Degree and diploma		
HIT		
Health education		
HEWs a)Urban-------- b)Rural--------		
Supportive staffs		

Nurse: pop. Ratio_____ Mid. Wife: pop. Ratio _____HEW: pop. ratio_____

Top causes of morbidity

Table5: Top ten leading causes of OPD visit (morbidity)

No	Disease	Adult		Total cases	%	No	Disease	Paediatrics/< 5year		Total case	%
		Male	Female					male	female		
1						1					

2						2					
3						3					
4						4					
5						5					
Total											

Immunization Coverage (for children and Women in child bearing age)

BCG P=----------A=--------%=---- OPV1 P=----------A=--------%=----- OPV3 P=----------A=--------%=------

IPV P=----------A=--------%=------- Measles1 P=----------A=--------%=------ Measles2 P=----------A=--------%=--

Penta1 P=----------A=--------%=------Penta2 P=----------A=--------%=------Penta3 P=----------A=--------%=------

PCV1 P=----------A=--------%=------PCV3 P=----------A=--------%=-------TT2+P.W P=----------A=--------%=-----

TT2+N.P.W P=----------A=--------%=------HP offering ICCM----------

Health budget allocation:

Government

Total budget allocated for the district_____

Total budget allocated for health_____ (____ %)

Health care financing generated by health centres

HC1 (2023) P_____A_____%_____

HC2 (2023) P_____A_____%_____

HC3 (2023) P_____A_____%_____

Auditing of HC budget

HC1 (2023) P_____A_____%_____

HC2 (2023) P_____A_____%_____

HC3 (2023) P_____A_____%_____

HC4 (2023) P_____A_____%_____

Funds from NGO

Total_____ (purpose/programs) _____

11. Community Health Services;

Status of services provided by community health workers namely

No. of Traditional brith attendant(TBA)s/TTBA _____and the irresponsibility_____

No. of CHWs/CHPs _____and the irresponsibility_____

ResponsibilityofHEWs_____

12. Status of Primary Health Care Components–with focus on the eight PHC

Elements

Delivery service

a)Attended by skilled birth attendants_____

b) HCS providing BEMONC_____

c) Kebele declared home delivery free_____

d) PLW tested for HIV_____

ANC service

a) 1st p=_____A=_____%_____

b) 4th p----------A=---------%-------

PNC service

a) Early p----------A=---------%-------

b) Late p----------A=---------%------

FP (Methods)

a) Short acting P=----------A---------%---------

b) Long acting P=----------A=---------%=---------

EPI

I) Service provision sites

a) Static site---------

b) Outreach site----------

II) Cold chain status

a) Health centre with functional refrigerator----------

b) Health centre without functional refrigerator--------

c) Health post with functional refrigerator------

d) Health post without functional refrigerator-------

III) Vaccine availability

a) Available vaccine----------

b) Not available vaccine----------

Environmental Health and sanitation

Latrine coverage:

a) Improved p----------A=---------%-------and

b) Unimproved p----------A=---------%-------

Kebele declared "open defecation free"----------

Communal latrine p----------A=---------%-------

others_____

Health Education (what, when, where, how and who conducted health education)

_____

Endemic diseases:

Common endemic diseases_____

Malaria:

5 years malaria data to see trends-_____

Total malarias kebeles_____and Pop at risk_____

ITNs coverage (including current distribution)_____is there IRS this year(No of kebeles)_____

Total cases/yr OPD ------IPD------- deaths/yr_____, <5yr cases_____deaths_____.

Table6: Five years trends of malaria starting from 2011-2015/2019-2023

S.No	Year	OPD Case	IPD case	Death	Remar
1	2019				
2	2020				
3	2021				
4	2022				
5	2023				
	Total				

Malaria supplies (Coartem,RDT,etc)shortage_____

Other issues_____

TB/Leprosy

Total TB cases p=----------A=--------%-------

PTB positive p=----------A=--------%-------

Extra PTB p=----------A=--------%-------

TB detection rate p=----------A=--------%-------

TBRx completion rate p=----------A=--------%-------

TB cure rate p=----------A=--------%-------

TBRx success rate p=----------A=--------%-------

TB defaulter p=----------A=--------%-------

Death on TBRx p=----------A=--------%-------

Total TB patients screened for HIV p=----------A=--------%-------

Total Leprosy cases p=----------A=--------%-------on Rx_____

HIV/AIDS;

Total peoples screened for HIV (last one year)_____

VCTP=----------A=---------%=---------

PITCP=----------A=---------%=---------

PMTCTP=----------A=---------%=---------

HIV prevalence_____

HIV Incidence (new cases/yr)_____

Total PLWHA_____

On ART_____

On Pre-ART_____

Other HIV prevention activities_____

Nutrition (malnutrition related OTPs, SC, TSF, CBN and PSNP activities)/HOand

Early warning

Total OTP sites_____, total admissions to OTP/yr_____

Total SC sites, _____, newly opened/yr_____, total admissions to SC/yr_____

Is there TSF (targeted supplementary feeding) program in the woreda _____

CBN program _____ PSNP _____other_____

General food security condition_____

Essential drugs (shortage):-_____

13. CBHI coverage in the woreda

Total HHs paid for community based health insurance(CBHI)__ coverage ___

Total CBHI ID cared received _____ coverage _____

14. High performing primary health care units

HC1(2019)P__A__%_____, HC2 (2020) P__A__%__ HC3 (2021) P__A__%__

15. Discussion of the high lights and the main findings of the health profile

Assessment and description

16. Problem Identification and Priority Setting– set priority health problems based on the public health importance, magnitude, seriousness, community concern, feasibility

Annex IV:System Evaluation Hypertension Questionaries

Health facility name(የጤና ተቋም ስም)		
Demographic Characteristics(ሕዝብ ግራፊክ ባህሪያት)	Age	□ 18-30 □ 31-40□ 41-50 □ >50
	Sex	Male □ Female □
What is your health facility (የእርስዎ የጤና ተቋም ምንድን ነው)	□ Medical Practitioner □ Public Health Staff □ Laboratory Staff □ Health Records Management Staff □ Other health facility □ Clinical Officer □ Nurse	
Number of years worked in health facility (አመታት ብዛት በጤና ተቋም ውስጥ ሰርቷል)	□ Less than a year □ 1-2 years □ 2-3 years □ 3-5 years □ More than 5 years	
What is your highest level of education?(ከፍተኛ የትምህርት ደረጃዎ ምንድነው?)	□ PhD □ Masters □ Degree □ Diploma □ Certificate	

Tick (√) in the most appropriate box & please complete the "comments" section for each attribute)

SIMPLICITY

	Strongly Disagree	*Disagree*	*Neither Agree or Disagree*	*Agree*	*Strongly Agree*	*Not Applic-able*	*Don't Know*

Q1. Reporting of hypertension surveillance data within the IDSR system is easy.(በ IDR ስርዓት ውስጥ የደም ግፊት ክትትል ውሂብ መዘገብ ቀላል ነው.)							
Q2. Forms for reporting hypertension surveillance data are easy to complete.(ለሪፖርተር ከፍተኛ የደም ግፊት መረጃ ፎርሞች ለማጠናቀቅ ቀላል ናቸው)							
Q3. Instructions and guidelines for completing the hypertension reporting forms are easy to understand(የደም ግፊትን መመሪያዎች እና መመሪያዎች መረዳት ቀላል ናቸው.)							
Q4. Understanding the functionality of the IDSR system is easy.(የ IDSR ስርዓት ተግባራትን መረዳት ቀላል ነው)							
Q5. All health personnel are conversant with the IDSR system.(እና ሰራተኞች ተገቢ converse, የ IDR ሥርዓት ጋር የተያያዙ ይሆናሉ)							
Q6. Case definitions for hypertension easily applicable.(ለየደም ግፊት በቀላሉ አግባብነት ላላቸው የጉዳይ ትርጓሜዎች.)							
Q7.Hypertension surveillance data is easily managed.(ግፊት ክትትል መረጃ በቀላሉ የሚተዳደር ነው።)							
Q8. The existing IDSR system easily accommodates all hypertension (አሁን ያለው የ IDSR ስርዓት ሁሉንም የደም ግፊትን በቀላሉ ያስተናግዳል)							
Q9. Methods used for collection of hypertension surveillance data are							

simply.(የደም ግፊት ክትትል መረጃዎችን ለመሰብሰብ የሚያገለግሉ ዘዴዎች በቀላሉ ናቸው።)							
Q10. Time spent collecting hypertension surveillance data is minimal.(የደም ግፊት ክትትል መረጃን ለመሰብሰብ የሚጠፋው ጊዜ በጣም ትንሽ ነው።)							
Q11. Methods used for analysis of hypertension surveillance data are simple.የደም ግፊት ክትትል መረጃን ለመተንተን የሚያገለግሉ ዘዴዎች ቀላል ናቸው.)							
Q12. Time spent in analysis of hypertension surveillance data is minimal.							
Q13. Minimal training is required to manage hypertension surveillance data.የደም ግፊት ክትትል መረጃን ለመቆጣጠር አነስተኛ ስልጠና ያስፈልጋል)							
Q14. The follow-up process for hypertension surveillance data is simple(የደም ግፊት ክትትል መረጃ የክትትል ሂደት ቀላል ነው)							
Q15. The reporting levels for hypertension surveillance data are minimal.(የደም ግፊት ክትትል መረጃ የሪፖርት ማድረጊያ ደረጃዎች ዝቅተኛ ናቸው።)							
Comments(አስተያየቶች) :							
ACCEPTABILITY (ተቀባይነት)							

	Strongly Disagree	*Disagree*	*Neither Agree or Disagree*	*Agree*	*Strongly Agree*	*NotApplic-ablle*	*Don't Know*
Q1. My contribution/s and input/s to the existing IDSR system is/are considered valuable.(*ለነባሩ የIDSR ስርዓት የእኔ አስተዋጽዎ/ዎች እና ግብአቶች/ዎች እንደ ዋጋ ይቆጠራሉ።*)							
Q2. I am satisfied with my involvement in hypertension surveillance activities in this facility.(በዚህ ፋሲሊቲ ውስጥ በከፍተኛ የደም ግፊት ክትትል ተግባራት ውስጥ በመሳተፍ ረክቻለሁ።)							
Q3. Fellow health personnel in this facility show interest in hypertension surveillance activities.(*በዚህ ተቋም ውስጥ ያሉ ባልደረቦች ለከፍተኛ የደም ግፊት ክትትል ተግባራት ፍላጎት ያሳያሉ።*)							
Q4. All actions regardin hypertension surveillance are adequately supported by the health facility management.(*የደም ግፊት ክትትልን በተመለከተ ሁሉም እርምጃዎች በጤና ተቋም አስተዳደር በበቂ ሁኔታ የተደገፉ ናቸው።*)							
Q5. Hypertension are considered of public health importance in the region.(የደም ግፊት መጨመር በክልሉ ውስጥ የህዝብ ጤና ጠቀሜታ ተደርጎ ይቆጠራል.)							

Q6. The community in this region support hypertension surveillance activities undertaken by this facility.(*በዚህ ክልል ውስጥ ያለው ማህበረሰብ በዚህ ተቋም የሚደረጉ የደም ግፊት ክትትል ስራዎችን ይደግፋል።*)							
Q7. The existing IDSR system protects users' privacy and confidentiality.(ያለው የIDSR ስርዓት የተጠቃሚዎችን ግላዊነት እና ሚስጥራዊነት ይጠብቃል)							
Comments :							
STABILITY (መረጋጋት)							
	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	*NotApplic-ablle*	Don't Know
Q1. The existing IDSR system has always been reliable when reportin hypertension surveillance data.(የደም ግፊት ክትትል መረጃን በሚዘግብበት ጊዜ ያለው የIDSR ስርዓት ሁል ጊዜ አስተማማኝ ነው።)							
Q2. Hypertension surveillance reporting forms are always available when required.(የደም ግፊት ክትትል ሪፖርት ማድረጊያ ቅጾች ሁል ጊዜ አስፈላጊ ሲሆኑ ይገኛሉ።)							
Q3. Problems experienced within the IDSR system regarding hypertension surveillance are addressed with minimal delays.(የደም ግፊት ክትትልን በተመለከተ በ IDSR ስርዓት ውስጥ ያጋጠሙ ችግሮች በትንሹ መዘግየቶች ይቀርባሉ)							

Q4. Hypertension surveillance and response is well supported by those overseeing disease surveillance and response activities in this region/facility.(የደም ግፊት ክትትል እና ምላሽ በዚህ ክልል/ፋሲሊቲ ውስጥ የበሽታ ክትትል እና ምላሽ ተግባራትን በሚቆጣጠሩት በደንብ የተደገፈ ነው።)							
Q5. Resources provided for hypertension surveillance and response activities in this region/facility are sufficient.(በዚህ ክልል/ፋሲሊቲ ውስጥ ለከፍተኛ የደም ግፊት ክትትል እና ምላሽ ተግባራት የሚሰጡ ግብዓቶች በቂ ናቸው።)							
Q6. Hypertension surveillance data and records storage in this facility is safe and efficiency.(የደም ግፊት ክትትል መረጃ እና በዚህ ፋሲሊቲ ውስጥ ማከማቻን መዝግቦ ደህንነቱ የተጠበቀ እና ውጤታማ ነው)							
Comments :							
FLEXIBILITY(ተለዋዋጭነት)							
	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	*NotApplic-able*	Don't Know
Q1. Is there any change in case definition of hypertensition							
Q2. Is there change in reporting formats of Hypertension							
Q3. Hypertension surveillance and response within the existing IDSR system easily adapts to changes in technology (e.g. paper-based to electronic-based							

reporting(*ባለው የIDSR ስርዓት ውስጥ ያለው የደም ግፊት ክትትል እና ምላሽ ከቴክኖሎጂ ለውጦች ጋር በቀላሉ ይስማማል (ለምሳሌ በወረቀት ላይ የተመሰረተ በኤሌክትሮኒክስ ላይ የተመሰረተ ዘገባ።*)							
Q4. The existing IDSR system easily adapts to hypertension surveillance data sources.(*አሁን ያለው የIDSR ስርዓት ከደም ግፊት ክትትል መረጃ ምንጮች ጋር በቀላሉ ይጣጣማል።*)							
Comments :							
USEFULNESS(ጠቃሚነት).							
	Strongly Disagree	Disagree	Neither Agree or Disagrees	Agree	Strongly Agree	*Not Applic-able.*	Don't Know
Q1. Hypertension surveillance and response within the IDSR system has enabled achievement of the surveillance objectives in the past one year in this region.(በIDSR ስርዓት ውስጥ ያለው የደም ግፊት ክትትል እና ምላሽ በዚህ የጤና ተቋም ውስጥ ባለፈው አንድ አመት ውስጥ የክትትል አላማዎችን ማሳካት አስችሏል።)							
Q2.Hypertension surveillance data has informed program implementation for control of the diseases in the past one year in this health facility.(በIDSR ስርዓት ውስጥ ያለው የደም ግፊት ክትትል እና ምላሽ በዚህ የጤና ተቋም ውስጥ ባለፈው አንድ አመት ውስጥ የክትትል አላማዎችን ማሳካት አስችሏል።)							

Q3. Hypertension surveillance data generated within the IDSR system has stimulated research activities in this health facility.(በIDSR ስርዓት ውስጥ የተፈጠረው የደም ግፊት ክትትል መረጃ በዚህ የጤና ተቋም ውስጥ የምርምር ስራዎችን አበረታቷል።)							
Q4. Hypertension surveillance data generated within the IDSR system has attracted donor funding for disease control in this health facility .(በIDSR ስርዓት ውስጥ የተፈጠረው የደም ግፊት ክትትል መረጃ ለጋሾች በዚህ የጤና ተቋም ውስጥ በሽታን ለመቆጣጠር የገንዘብ ድጋፍን ስቧል።)							
Q5. Hypertension surveillance and response activities in this health facility are considered important within the IDSR systems.(በዚህ የጤና ተቋም ውስጥ የደም ግፊት ክትትል እና ምላሽ ተግባራት በIDSR ስርዓቶች ውስጥ እንደ አስፈላጊ ተደርገው ይወሰዳሉ።)							
Q6. The IDSR system provides sufficient information for prompt public health action to hypertension in this health facility.(የIDSR ስርዓት በዚህ የጤና ተቋም ውስጥ ላለው የደም ግፊት ፈጣን የህዝብ ጤና እርምጃ በቂ መረጃ ይሰጣል።)							
Q7. Hypertension surveillance data generated within the IDSR system provides an estimate of morbidity magnitude in this health facility.(በIDSR ስርዓት ውስጥ የሚፈጠረው የደም ግፊት ክትትል መረጃ በዚህ የጤና ተቋም ውስጥ ያለውን የበሽታ መጠን ግምት ያሳያል።)							

Q8. Hypertension surveillance data identifies risk factors associated with the cases reported.(የደም ግፊት ክትትል መረጃ ከተዘገቡት ጉዳዮች ጋር ተያይዘው የሚመጡ አደጋዎችን ይለያል።)							
Q9. Hypertension surveillance data generated within the IDSR system detects trends in changes of case occurrence in this health facility.(በIDSR ስርዓት ውስጥ የሚፈጠረው የደም ግፊት ክትትል መረጃ በዚህ የጤና ተቋም ውስጥ የሚከሰቱ የጉዳይ ለውጦች አዝማሚያዎችን ያሳያል።)							
Hypertension surveillance data enables prevention and control programmes impact assessment in this region.(የደም ግፊት ክትትል መረጃ በዚህ የጤና ተቋም ውስጥ የመከላከያ እና የቁጥጥር መርሃ ግብሮችን ተፅእኖ ግምገማን ያስችላል።)							
Q11. Hypertension surveillance data generated within the IDSR system has an impact on the clinical diagnosis practices.(በ IDSR ስርዓት ውስጥ የሚፈጠረው የደም ግፊት ክትትል መረጃ በክሊኒካዊ የምርመራ ልምዶች ላይ ተፅእኖ አለው)							
Comments :							
DATA QUALITY (የውሂብ QUALITY)							
	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	*Not Applic-able*	Don't Know
Q1. Missing data is a common occurrence in hypertension surveillance reporting forms in this region.(*የጠፋ መረጃ በዚህ*							

የጤና ተቋም ውስጥ የደም ግፊት ክትትል ሪፖርት ማድረጊያ ቅጾች ላይ የተለመደ ክስተት ነው።)							
Q2.Surveillanceelectronic/hardcopy forms for reportin hypertension are clear and elaborate.(የክትትል ኤሌክትሮኒክ/ደረቅ ኮፒ ቅጾች ለሪፖርቲንግ የደም ግፊት ግልጽ እና የተብራሩ ናቸው።)							
Q3. Training offered regarding completion o hypertension surveillance reporting forms is adequate.(ስለ የደም ግፊት ክትትል ሪፖርት ማድረጊያ ቅጾች ማጠናቀቅን በተመለከተ የሚሰጠው ስልጠና በቂ ነው።)							
Q4. Supervision offered during hypertension surveillance reporting forms completion is adequate.(የደም ግፊት ክትትል ሪፖርት ማድረጊያ ቅጾችን ሲያጠናቅቁ የሚሰጠው ክትትል በቂ ነው።)							
Q5. Time allocated for hypertension surveillance data management is adequate.(የደም ግፊት ክትትል መረጃ አስተዳደር የተመደበው ጊዜ በቂ ነው።)							

Annex V:Meher Season Rapid Health and Nutrition Need Assessment: Region/Zonal checklist/Questionaries

Interviewer name _____ Organization/Institution: _____

Interview Date: (dd) _/(mm)___/2016EFY Region: ___

Zone: ____

Main contact at this location: Name: ___ Position: __

SECTION I: SOCIO- DEMOGRAPHIC PROFILE			
Régíon /Zone Total Population	M: _____F:_____	Under 5_____	Total: ____

	No. of women of reproductive age (age 15-49 yrs.) _____			
	No. of pregnant and lactating women: _____			
Special Population *(if any)*	Pastorals____	Refugees_ ___	IDPs____	

Numbers of Hospital (all type) _____

Number of HCs_____

Number of HPs_____

Number of Mobile health and Nutrition teams _____

Number of HEWs_____ Number of HW_____

Total number of SC sites_____

Total Number of OTP/SC reporting _____#SC (_____ %) _____#OTP (_____ %)

SECTION II: Emergency Nutrition Preparedness

Coordination and preparedness

Is there emergency nutrition focal person at Region/Zone level? If yes, How many_____ ?	Yes□ No□
Is there RRT at region/zone level, if yes how frequently they meet (observe the minute)	Yes□ No□
Is the nutrition focal person a member of the region/zonal RRT?	Yes□ No□
Is there a multi sector al emergency nutrition coordination forum?? If yes how frequently meet? _____ Which sectors are member? List	Yes□ No□ Yes□ No□
Are all relevant government, NGOs and UN agencies represented at in the forum?	Yes□ No□
Is there a public health Emergency preparedness and response plan for EFY2016? Observe and comment _____ If yes, what are the major anticipated diseases/health events?	Yes□ No□ Yes□ No□

How many HC/Hospital have SC in your region/zone (identify functional and not functional)	Functional____#_____%, not functional____#_____%
How many SC have safe water access (list sources of water)	_____#_____%
How many health posts have functional OTP services	_____#_____%
Staff training	

Training on New IMAM(Integrated mgt of acute malnutrition) guideline

Professional	Total Number	#trained	% of trained	Date of the training given
HEW				
HEW Supervisors				
WrHO(Nurses &others)				
HC Nurses				
Zonal and Hospital staffs				
Training on Emergency IYCF				
HEW				
HEW supervisor				
WrHO(Nurse or Other)				
HC Nurses				
Zonal and Hospital staffs				

SECTION III: SURVIELLANCE

How many priority woredas are there in your region/zone?	_____
Is there TSFP programs in these woredas	Yes□ No□, if No skip to Q, 13
Who are the beneficiaries of the program	
Is there NGOs in the region/zone supporting emergency nutrition intervention during the last three months?	Yes□ No□ if No skip to Q, 15

List the organization with their intervention program, duration of the program, the beneficiaries, and geographic coverage(#

Woredas) _____									
Screening performance of U5 children in the last Five months									
	Target Children 6-59 months	# of screened children	Screening Coverage (%)	#SAM			MAM	Proxy SAM (%)	Proxy GAM (%)
				without edema	Edema	Total SAM			
June									
July									
August									
September									
October									
	#MAM enrolled to TSFP	#SAM enrolled to OTP	#SAM referred to SC	#SAM reported from HMIS	#SAM reported from weekly report (4 week aggregate)		#SAM death reported from HMIS	SAM death reported from weekly report	
June									
July									
August									
September									
October									
16.Screening performance of PLW in the last Five months									
	Target PLW	# of screened	Screening Coverage	#MAM	MAM enrolled to TSFP		Proxy MAM (%)	Remark	

June							
July							
August							
September							
October							

SECTION IV: MONITORING AND EVALUATION	
Do you conduct supportive supervision	Yes□ No□, if no skip to Q, 19
If yes, how frequently	
Do you conduct Initial Rapid Assessment in case of sudden increase of malnutrition cases or during any health risk events (Eg during IDP)?	Yes□ No□,
Do you share information with other stakeholder like Education, agriculture, DRM or other?(list the sectors)	Yes□ No,
Do you alert the lower level for any existing risk in other sectors that may affect nutrition?	Yes□ No□, if no skip to Q 24
Do you analyze nutrition information/report/	Yes□ No□, if no skip to Q 24
If yes, how frequently	
do you give feedback for nutrition performance for the for lower level	Yes□ No□, if no skip to Q 26
If yes, how frequently	
How many OTP and SC sites have reported in the last month	OTP___#_____% SC____#_____%
Is there woredas or facilities that repetitively didn't report?	Yes□ No□, if no skip to Q 34
What is the reason for not reporting or not reporting timely? _____	
What was the recent vitamin A supplementation coverage of the	
What was the recent De worming coverage	

What is the coverage of measles in the last month	
Do you get nutrition performance report during emergency situation (Eg. from IDP site)	Yes□ No□, if no skip to Q 34
If yes, how_____	

SECTION V: POTENTIAL HEALTH AND NUTRITION RISK	
Is there IDP/returnees in your Region/Zone (HH=_____, Population=_____)	Yes□ No□,
If yes, is there any existing o potential health risks in DP/ Returnee area	Yes□ No□, if no skip 37
list the health risks (indicate your preparedness and response activity) _____	
do you think e isting returnee/IDPs are aff cting health care financing	Yes□ No□,
Is/Are there any currently ongoing outbreak in your region/zone	Yes□ No□, if no skip to Q42
what is/are the outbreak _____Number of cases _____Deaths Duration of the outbre k	
Do you have adequate supplies to respond?	Yes□ No□,
What are the major challenges in responding the situation	
SECTION VI: RECOVERY	
Is there any damaged health facilities in your region/zone due to emergency?	Yes□ No□, No□, if no skip to Q45
If yes, how many health facilities have been damaged? HP =____# partially ____# Totally HC=_____# partially ____# totally Hospital =_____# partially _____# totally	
How many of them are repaired/reconstructed HP =____# Repaired ____# not repaired HC=____# Repaired ____# not repaired Hospital =____# Repaired ____# not repaired	
Has there been unusual health risk occurred in your region/zone in the last three months (disease	Yes□ No□, No□, if no skip

epidemic, IDP, returnees)	to Q49
If y s, does it poses shortage of drug, other medical and nutritional supplies	Yes□ No□, if no skip to Q49
In how many woredas and health facilities? _____	
What are the major shortage existing currently due to the situation _____ _____	

SECTION VII: KEY INFORMANT INTERVIEW (KII)

What were the major challenges in your emergency nutrition response experience? _____

What were the major challenges in your Epidemic response experience? Any other comments in health emergency

_____

What are the anticipated disease or any potential emergency health risks in this region/zone (how much is your preparedness and risk mitigation activities and what are the major challenges on preparedness). include malaria, measles,Choleraandothersifany_____

you think global pandemicity of the COVID 19 poses challenge on other health and nutrition emergency response?_____

What do you thinks are the observed challenge and what were your solution? _____

Meher season rapid health and nutrition need assessment: Woreda level checklist

Interviewer name _____ Institution:_____

Region:_____

Interview Date: (dd) ____/(mm)_____/2016EFY

Zone: _____Woreda _____

Main contact at this location: Name:_____ Position:_____ Tel:_____

SECTION I: SOCIO DEMOGRAPHIC PROFILE				
Woreda total population=_____	M: _____F:_____		Under 5_____	Total: ____
	No. of women of reproductive age (age 15-49 yrs.) _____			
	No. of pregnant and lactating women: _____			
Special Population *(if any)*	Pastorals____	Refugees_ ___	IDPs____	
Number of Primary Hospital	_____			

Number of HCs	_____
Number of HPs	_____
Number of Mobile health and Nutrition teams	_____
Number of HWs	_____
Number of HEWs	_____
Number of SC	_____
Number of OTP	_____#SC_____#OTP
Number of reporting SC/OTP	

SECTION II: PREPAREDNESS AND COORDINATION	
Is there emergency nutrition focal person at woreda level? If yes, how many_____ ?	Yes□ No□ if no, skip to Q2,
Is there RRT at Woreda level, if yes how frequently they meet (observe the minute)	Yes□ No□
Is the nutrition focal person a member of the woreda RRT?	Yes□ No□
Does the Woreda Health Office regularly report PHEM report as scheduled dates? If yes, Observe copies and comment	Yes□ No□
Is there a multi sector al emergency nutrition coordination forum?? If yes how frequently meet? _____ Does Woreda nutrition focal person participate in this forum?	Yes□ No□ Yes□ No□
Is there a Public Health Emergency preparedness and response plan for EFY2014? Observe and comment _____ If yes, what are the major anticipated diseases/health events?	Yes□ No□ Yes□ No□

Emergency nutrition supplies for the coming three months

Do you have the following medical and other nutrition supplies for the coming month

	Description	

Nutrition and other supplies	F100	Yes□ No□
	F75	Yes□ No□
	RUTF	Yes□ No□
	ReSoMal	Yes□ No□
	Iron Sulfate	Yes□ No□
	Routine antibiotics at SC/OTP (*annexed the list*)	Yes□ No□
	Quick references	Yes□ No□
	Guidelines, SAM, CMAM, and others	Yes□ No□
	Supply request format	Yes□ No□
	Weekly reporting format	Yes□ No□

Capacity Preparedness	
How many HC/hospital have SC in your Woreda (identify functional and not functional)	Functional____#_____%, not functional ____#_____%
How many SC have safe water access (list sources of water)	_____#_____%
How many Health posts have functional OTP services	_____#_____%

Training				
Training on New IMAM guideline				
Professional	Total No,	#trained	% of trained	Date of training
HEW				
HEW Supervisors				
WrHO(Nurses &others)				
HC and P. Hospital Nurses				
Training on Emergency IYCF				
HEW				

HEW supervisor					
WrHO(Nurse or Other)					
HC Nurses and P. Hospital					
SECTIONIII: RESPONSE					
Is this priority one Woreda					Yes□ No□ if no skip to Q, 14
If yes, Is there TSFP program in this woreda					Yes□ No□
who are the beneficiaries of the program					
Is there NGOs in this woreda supporting emergency nutrition intervention during the last three months?					Yes□ No□
List the organization with their intervention program, duration of the program, the beneficiaries, and geographic coverage(# kebele)					
Screening performance of the last Five months month					

	Target Children 6-59 months	# of screened children	Screening Coverage (%)	#SAM			#MAM	Proxy SAM (%)	Proxy GAM (%)
				without eodema	Eodema	Total SAM			
June									
July									
August									
September									
October									

	#MAM enrolled to TSFP	#SAM enrolled to OTP	#SAM referred to SC	#SAM reported from	#SAM reported from weekly report (4 week	#SAM death reported from HMIS	SAM death reported from weekly report

				HMIS	aggregate)		
June							
July							
August							
September							
October							

PLW Screening performance of the last Five months

	Target PLW	# of screened	Screening Coverage	#MAM	MAM enrolled to TSFP	Proxy MAM (%)	Remark
June							
July							
August							
September							
October							

SECTION IV: MONITORING AND SURVEILLANCE	
Do you conduct supportive supervision	Yes□ No□, if no skip to Q, 20
how frequently	
Have you experienced sudden increase of malnutrition rate?	Yes□ No□, if no skip to Q 22
Did you conduct assessment to know the reason?	Yes□ No
Do you analyze nutrition information/report/	Yes□ No□, if no skip to Q 24
How frequently	
do you give feedback for nutrition performance for the lower structure	Yes□ No□, if no skip to Q

	26
how frequently	
How many OTP and SC sites have reported in the last month	OTP___#_____% SC____#_____%
Is/are there facilities that repetitively fail to report completely or do not report timely	Yes□ No□, if no skip to Q 29
What is the reason for not reporting or not reporting timely?	
What was the recent vitamin A supplementation coverage	
What was the recent De worming coverage	
What is the measles coverage of the last month	
Do the health facilities and HEWs regularly report PHEM report on scheduled dates?	Yes□ No□,
Do you get nutrition performance report during emergency situation (Eg. from IDP site)	Yes□ No□, if no skip to Q 35
How do you get that report (is integrated to WrHO routine report or with other prepared format, or from other sectors like DRMC)	
IF no for Q33, In what way do you think it poses the challenge in emergency response_____	
SECTION IV: POTENTIAL HEALTH AND NUTRITION RISK	
Is there IDP/returnees in your woreda (HH=_____, Population=_____)	Yes□ No□, if no skip to Q40
is there any existing or potential health risks in IDP/ Returnee area	Yes□ No□, if no skip to Q40
list the health risks (indicate your preparedness and response activity) _____	
do you think existing returnee/IDPs are affecting health care financing	Yes□ No□,
Is there any currently ongoing outbreak in your Woreda	Yes□ No□, if no skip to Q44
what is the outbreak _____Number of cases _____Deaths	

_____ Duration of the outbreak	
Do you have adequate supplies to respond?	Yes□ No□,
What are the major challenges in responding the situation _____	
SECTION V: RECOVERY	
Is there any damage on health facilities in your woreda?	Yes□ No□, No□, if no skip to Q47
How many health facilities have been damaged? HP =____# partially ____# Totally HC=_____# partially ____# totally Hospital =_____# partially _____# totally	
How many of them are repaired/reconstructed HP =____# Repaired ____# not repaired HC=____# Repaired ____# not repaired Hospital =____# Repaired ____# not repaired	
Has there been unusual health risks occurred in your woreda in the last three months (disease epidemic, IDP, returnees)	Yes□ No□, No□, if no skip to Q51
Does it poses shortage of drug, other medical and nutritional supplies	Yes□ No□, if no skip to Q51
In how many health facilities? _____	
What are the major shortage existing currently due to the situation	

Morbidity (disease in population)

	# cases in last 30 days	# deaths in last 30 days
□ Measles		

□ malaria		
□ acute respiratory		
□Diarrhoeal diseases		
□ cholera		
Others(specify)		

Key Informant Interview (KII)

What did you observe nutrition emergency management in facilities in your woreda?_____

What were the major challenges in your emergency nutrition response experience?_____

Are the services accessible particularly for vulnerable groups such as elderly and disabled? If not why not? ------

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What is your recommendation to improve emergency nutrition managements?----------

Do you think global pandemicity of the COVID 19 poses challenge on other health and nutrition emergencyresponse?_____

What do you thinks are the observed challenge and what were your solution?

Annex:VI lists of Photos/pictures during different activities

1:Photo that shows during participation on Workshops at Adama

At Adama Executive hotel

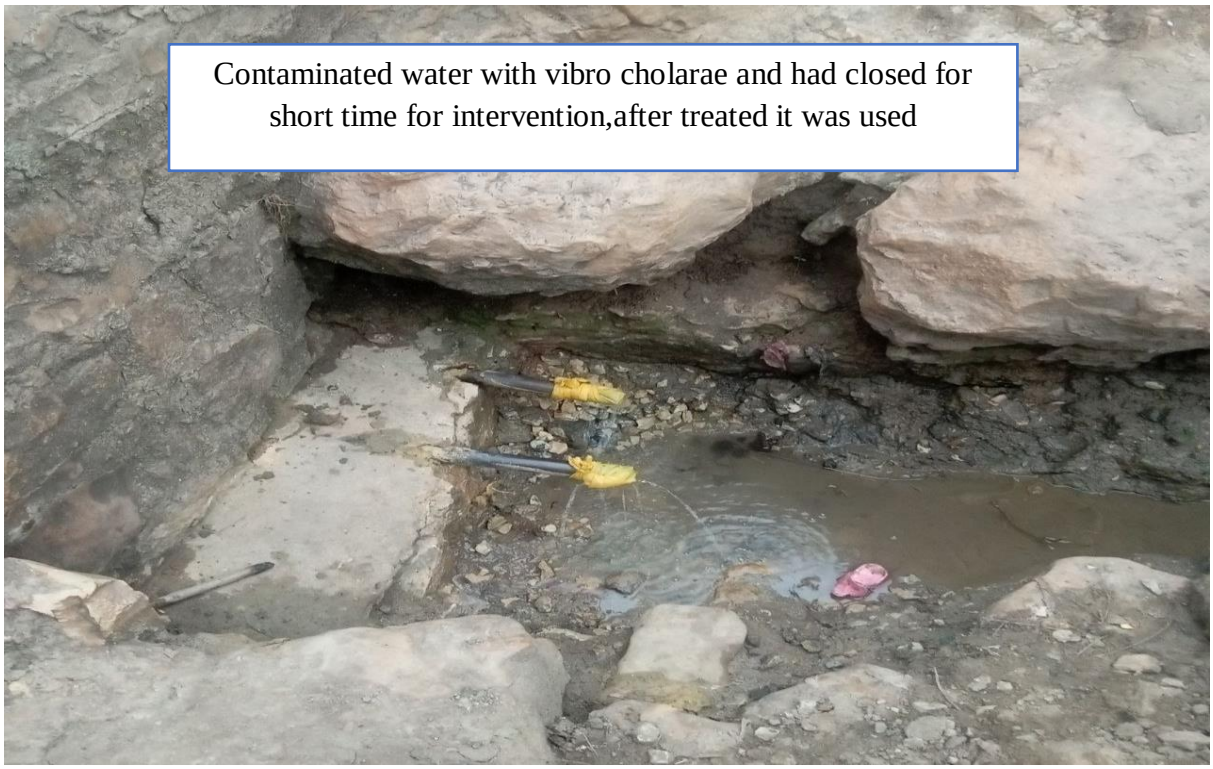
2. Photo participation on Museum Exhibition

3: Photo that captured during participation Annul research Conference

4.Picture that taken during Cholera outbreah investigation and response at Haramaya woreda,Awumera kebele

Where index cholera case was reported after drank water from this source

During investigation



Contaminated water with vibro cholarae and had closed for short time for intervention,after treated it was used

Onsite supportive supervision at cholera treatment center,Haramaya Woreda